TWO PAPERS ON ELECTRICITY.

By Bernard M. Drake, M.I.E.E., and H. R. J. Burstall, M.Inst.C.E.

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I. SOME PRACTICAL HINTS ON THE PRODUCTION AND USE OF ELECTRICITY FOR LIGHTING COUNTRY HOUSES.

By Bernard M. Drake, M.I.E.E.

THE electric light is no longer the light of the future; it is essentially the light of the present, and has come to stay. Only a few years back its use in a country house was regarded as a curiosity; now, the redolent oil lamp and guttering candle have been laid aside with the high-wheeled bicycle and other relics of bygone days. Thus to the multifarious knowledge of the architect must now be added a grasp of the "practics" of electric lighting and its attendant paraphernalia.

Fortunately the development of the industry has brought with it simplification, and whereas it was usual to cover a wall with switchboards, the functions of which were regarded as a trade secret to be imparted only to the initiated, now it is found possible to meet all practical requirements with three or four switches, which any gardener can learn in an hour to manipulate. Any amateur can elaborate, but the work of a genius will be stamped by its simplicity.

It is manifestly impossible in a short Paper to do more than skim this intricate subject, and the writer has tried to confine himself to the practical points which crop up daily in an architect's office, and are searched for in vain amongst the miscellaneous text-books on electric lighting at his disposal. It has been remarked with some truth that those who know are too busy to write books, and those who fail to make a success of their own business are ever ready to turn to the instruction of others as a means of livelihood; certainly with regard to electric lighting this applies in more ways than one.

In the following remarks it is assumed that the superiority of electric lighting is now so well proved that no attempt is necessary to make the most of its advantages, or to conceal the pitfalls into which the unwary may stumble. In discussing the matter with architects, the writer feels that to make his Paper of practical use he must state frankly the *pros* and *cons* of the different courses open, even at the risk of conveying the impression that the system is not altogether without its drawbacks.

The first question that naturally occurs in lighting a country house is the provision to be made for the generating plant, and where it shall be put. This brings us to a consideration of the different developed methods at our disposal, which are briefly as follows:—1. Steam

Engine; 2. Petroleum Engine; 3. Gas Engine; 4. Water-wheel or Turbine; 5. Wind Engine; 6. Primary Battery. The advantages and disadvantages of each may be summed up as follows:—

1. Steam Engine.

Advantages.—Is more developed than any other, and being made in larger quantities is better value. More understood by local engineers, and therefore more easily repaired; yields a steady light free from pulsations; has a storage in the boiler, and is therefore less liable to sudden stoppage.

The two principal classes of steam plants are—(1) The Cornish or Lancashire separate boiler, requiring a chimney (preferably of brick), which supplies steam to an independent engine; (2) The so-called semi-portable self-contained engine and boiler. The former is by far the most durable, and should be used where hard work is expected or the water produces incrustation. The engine and dynamo may be coupled direct, but for country-house work the belt is a safeguard, for it is thrown off in case of faulty manipulation, and the dynamo saved rom damage. The semi-portable occupies less space, and saves considerably in builder's work; it may be advantageously put down where the house will only be occupied for part of the year, provided a supply of soft water is available.

Disadvantages.—A steam engine requires careful stoking, or it will make smoke; it takes half an hour to get up steam, and uses a considerable amount of coal before the run commences; the attendant cannot safely leave it while at work, and it uses three gallons of water per horse-power per hour, which must be specially treated if it is likely to produce scaling in the boiler. There is possible risk of explosion if the water is allowed to run low, and it requires considerable outlay in building and foundations.

2. Petroleum Engine.

Advantages.—Requires the attendant only at starting and stopping, with occasional visits to inspect bearings. Cartage from the nearest station is only one-sixth the weight of the coal that would be required for the same output. Requires little outlay for foundations and builder's work. Risk of explosion practically *nil* if carefully arranged. Only a small quantity of water is required for cooling the cylinder.

Disadvantages.—Smell of the exhaust, which will travel 200 yards if allowed to escape from a hot iron pipe as sent out by most of the makers, though it can be rendered imperceptible at fifty yards if properly treated. The same applies to noise of exhaust. Engine requires an expert if it becomes deranged; petroleum is liable to market fluctuations; the light is subject to pulsation unless sufficient fly-wheels are provided. Being dependent on a separate explosion for each movement of the piston, it is more liable to sudden stoppage than a steam engine. The fire insurance companies require special arrangements to be made for the storing of petroleum.

3. Gas Engine.

Advantages.—Requires less attention than steam or petroleum, and less cleaning after work. Is more perfected than the petroleum engine, and cheaper in first cost. More easily repaired, and less likely to get out of order. No cartage of fuel required or trouble of ordering coal or petroleum. Small outlay for builder's work. Can be started in a few minutes.

Disadvantages.—Noise of exhaust if not properly treated. Gives a pulsating light unless sufficient fly-wheels are fitted. Requires gas supply to be regular and of even pressure.

Risk of gas supply being intercepted by frost. Is dependent on each explosion for continuity of action.

4. Water Turbine, or Wheel.

Advantages.—Where a good head of water is available it is undoubtedly the best source of power, requiring the minimum of attention, capable of being started immediately, yielding a light free from pulsation, and wearing better than any of the preceding engines. Even where there is no large fall at any one place, it is frequently possible to dam up the course of the stream and carry a pipe to a lower position, where the turbine may be placed. As the charging only occupies a few hours a day, it is often possible to bring into use discarded mills which were abandoned as being incapable of providing continuous power; it is also practicable to utilise a stream which in itself would give only a fraction of the necessary power by allowing it to accumulate during the twenty-four hours.

Disadvantages.—Extra first cost due to earth work, especially with low falls. Risk of stoppage from severe frost. In comparing water-power with engines, the interest on additional first cost must be balanced against the coal bill saved.

5. Wind Engine.

Can only be recommended as an auxiliary in regular practice, the cost of accumulators necessary to tide over a long period of stillness being far greater than that of an auxiliary engine, apart from the fact that an accumulator cannot be kept in order with a small charging current.

6. Primary Battery.

The direct production of electricity without engine and dynamos may be accomplished some day on a practical basis, but so far the attempts have proved far more costly than engines and dynamos, and have required too much attendance. Most of these have used either zinc or iron, and carbon with nitric and sulphuric acid, and have been discarded owing to the nitrous fumes produced, the difficulty of keeping the cells in order, and the rapid depreciation. Later modifications are stated to be an improvement in details, though the outlines appear to be the same. Owing to the high resistance and polarisation or production of bubbles on the surface of the plates, there will always be difficulty in maintaining the voltage constant, unless the primary battery is merely used to charge an accumulator.

It will be seen from the above that each case requires an individual study of the local conditions and working requirements before deciding what will be best, and it is not a matter which can be safely left to the decorator or hot-water engineer to diagnose. The writer has frequently found that a combination of gas and petroleum, or turbine and steam engine, gives the best results.

Dynamo.

From whatever source the power is obtained, the dynamo for ordinary requirements is the same, except that it will be required to be fitted with a fly-wheel for use with petroleum and slow speed gas engines, provided the engine has to be run while the lights are used. Where only required for charging the accumulators, this may be omitted, as it wastes a certain amount of power.

The most important features in the dynamo for country house lighting are:

1. *Absence of Sparking.*—Sparking will wear out both brushes and commutator.

2. *Perfect Balance of the Armature or Revolving Portion of Machine.*—Vibration (which

can be detected by placing the hand on the frame) is one of the causes of what are known as flats on the commutator. It is useless to try and bolt down a badly balanced machine, for the trouble will only recur at intervals when the bolts have shaken loose.

3. *Strong Shaft and Wide Bearings.*—Unless the shaft is very strong and the bearings wide, there will be trouble from hot bearings, for the strain produced by the magnets when the metal begins to wear is very great.

4. *Good Automatic Lubrication.*—The best form of lubricator is a loose ring revolving in an oil bath. This avoids any risk of the bearing being damaged owing to the attendant having forgotten to fill the lubricators, for by this system the oil only requires renewal after long intervals.

5. *Absence of Heating.*—Undue heating of the armature and magnets, say 70 degrees above that of the engine room, means unnecessary loss of efficiency.

Accumulator.

This may be taken as a necessity in every country house installation, and the position of the room for its accommodation will require careful consideration. For reasonable distances up to 150 yards the engine and accumulator rooms should be placed alongside each other, as the attendant can see that each cell charges up equally, which is essential to success. He can also switch down the discharge regulating switch, and thus keep the voltage on the lamps regular while the engine is running. On the other hand, there is more loss of brilliancy in the lights as the full number are switched on, than would take place if the cells were put in, or close to, the main building.

Where the current is brought from a distance, or the light will always be supplied from the accumulator alone, a considerable saving can be made in the cost of cables by separating the engine and battery room. This question, therefore, can only be decided after a study of all the working conditions. In any case, it must be remembered that there should be no direct communication between the dynamo and cell room, or the cotton insulation will be found to rot off the dynamo after a few years.

In selecting a type of accumulator, the main question is absence of attention, which can only be obtained by having the plates well apart, say half an inch, so that any detached portions fall away, instead of bridging across and exhausting the cell. If one or two cells are empty the light will be bad, although all the rest may be perfect.

A slight increase in internal resistance is of minor importance compared with the extra reliability obtained. In the writer's opinion, a clear space between the plates is also preferable to enclosing them in any form of celluloid bags or wrappings, which soon become clogged with oxides. If space permits, arrange the stands to be accessible from both sides, as they can be more easily examined and handled.

Meter.—The use of a registering meter is recommended in the engine room as the best check on the amount of coal, oil, or gas consumed. It also shows whether the lights have been left burning, or used extravagantly.

Position of Engine House.—Place with due regard to prevailing wind, and not less than fifty yards from the main building.

Cost.

Having considered local conditions as to smoke, smell, noise, and labour, the next question is the relative cost of working and first cost. The following data may be taken to apply to the

average country house installations, and will assist in determining the class of motive power to be adopted:

A unit = 15 lamps of 16 candle-power lit for an hour.

Fuel.	Coal required per unit	12 lbs.
	Gas required per unit	50 cubic feet.
	Petroleum required per unit	$1\frac{3}{4}$ pints.

Thus, for purposes of comparison, the cost of fuel for the engine will be equal with—

Coal costing 22*s.* per ton . . . . .
= Gas costing 2*s.* $4\frac{1}{2}d.$ per thousand feet . . } = 1·4*d.* per unit.
= Petroleum costing $6\frac{1}{2}d.$ per gallon . . . .

The above is a liberal estimate providing for cost of getting up steam and contingencies.

Although coal usually costs less than 22*s.* per ton, and is therefore cheaper in running cost than the other engines, a provision must be made for the additional labour, which usually brings the total to about the same figure for a country house of average size.

For large installations the cost per unit is naturally lower. The following are the results of a week's recent test with a modern generating plant for 2,000 lights, designed by the writer:

Coal for engine	·572*d.*	per unit
Labour	·395	,,
Lubricating oil	·056	,,
Water—say	·040	,,
Repairs—say	·091	,,

Total running cost per unit 1·154*d.*

Labour.—It is difficult to determine the exact provision for labour, but assuming that the man can, in the case of gas or petroleum engines, attend to other work while the engine is running, whereas he must stand by a steam engine during the run, the following will act as a guide:

A turbine will occupy one-ninth of his time.
A gas engine will occupy one-sixth of his time.
A petroleum engine will occupy one-fourth of his time.
A steam engine will occupy one-half of his time.

With a well designed installation it is no longer necessary to have a skilled engineer to work the plant, provided everything is large enough to do its work easily. With such a plant, any estate hand, groom, or gardener can be taught to handle the apparatus, but if the first cost is cut down and the plant is strained, it is often necessary in the after working of the plant to spend double what should have been necessary.

Working Cost.—The total units per annum per lamp fixed may be averaged at seventeen for a house inhabited for most of the year, and the average running cost at 3*d.* per unit, or for 150 lights fixed, which is a fair sample for a medium-sized country house, an annual cost of £37 10*s.* This includes provision for labour and repairs, but not for maintenance and reserve fund, for which a sum of £37 10*s.*, or 5 per cent. on £750, may be laid by annually, though it should not be wanted for several years. If interest is to be added, an allowance must be made for the cost of gas apparatus or lamps that would otherwise have been required.

The above are general figures which will vary somewhat in each case, but the writer has taken them from the results of several hundred installations which he has designed and laid

down, and it is hoped they will form a useful guide in deciding what generating plant to adopt.

Treatment of Rooms.

Light resembles happiness; it is a matter of contrast, and must be treated accordingly. Mr. Alma Tadema has a small door to his atrium, in order that its size may be the more felt on entering; so must the degree of light be graduated throughout a building. On entering a dimly lit hall from the dark it appears brilliant; but this, again, must be eclipsed by the light of the reception rooms. So, too, we must, as in a good photograph, have our light and dark portions and our semi-tones, for a room lit equally throughout gives a flat effect, and is neither artistic nor restful.

It should also be remembered that the pupil of the human eye has considerable power of expansion and contraction, and in the presence of a bright light an involuntary contraction takes place. When reading with the pupil contracted, a tired feeling is produced which may ultimately result in eye troubles. There is little doubt that the ignorance of electricians concerning this simple fact is responsible for the complications ascribed by oculists to the electric light itself. The filament of a lamp is the size of a thread, and the eye must not be subjected to the direct rays of this concentrated form of light.

Take two lamps of equal power—one with a clear globe, the other frosted. Although we know that photometrically the frosting obstructs about 10 per cent. of the light, the remaining 90 per cent. gives more apparent light, because it emanates from a larger surface. Thus the secret of a restful light is the illumination of a large surface with an absence of any dazzling spots of small area. In a room thus lit the pupil of the eye expands to its full limit, and the weakest eyes can read with a comfort that cannot be obtained in any other way.

To get this result we must either diffuse the rays by transmitting them through a large shade, or we must trust to reflection and project the direct rays on the walls and ceiling from some hidden source [*see illustration*, p. 87]. The illuminated surface is then greater than that of even the largest shades, and the effect more restful. We are, however, practically debarred from this treatment on the score of expense unless the colour of walls and ceiling is very light; in the latter case, it is capable of wide adaptation. The writer believes he was the first to employ a combined shelf and picture rail containing a row of hidden lamps for reflected light. Pretty effects can also be produced with small lamps concealed in the overmantel and in china cabinets [*see illustrations*, p. 89].

Fittings.—We next come to the question of fittings, which to the user is a most important item, though to the electrical engineer it is frequently considered merely a matter of selection.

In old houses we are practically tied to an adaptation of the candle fittings in existence, for they are usually in accordance with the style of the room. Objection is sometimes raised to the use of imitation candles as being inartistic, but it must be remembered that the designer had the candle in view as the basis of his outline, and without it the proportions are wrong, and the drip cups and other parts meaningless. An incandescent lamp springing direct from a candle socket is a squat abortion that has nothing to commend it.

If, therefore, these fittings are to be retained, every effort should be made to get the precise effect of candles without their disadvantages, and as far as possible to conceal the fact that electric light has been employed. The writer remembers once at a dinner party a guest congratulating his host on having kept to wax candles on the table—and by the way, he added, "What good candles they are!"

Examples are shown of the way in which old fittings may be treated without detriment

TYPICAL LIBRARY LIGHTING.

REFLECTED LIGHT IN MESSRS. DRAKE AND GORHAM'S OFFICE.

to their appearance, and attention is called to the economy of shading only the front of lamps placed against a wall, for thus the full advantage of reflection is obtained, and an 8 candle-power lamp will take the place of a 16 candle-power if totally enclosed.

For shades an equally pretty substitute for silk has yet to be found; but horn, glass, and beads are all capable of cleaning, and paper is cheap to replace. Celluloid is dangerous, as it is capable of being ignited by the heat of the lamp. A hint must be given as to the necessity of testing these with electric light before making a selection, for if chosen by day-light alone, the result is often disappointing. It is possible to dispense with metal fittings altogether by working the lamps into plaster-work in the ceilings; but this treatment, unless carefully arranged, gives a patchy appearance, and lowers the rooms. There is also a risk of blackening the ceiling near the lamp, due to the currents of air produced by the heat of the filament.

Care must always be taken to leave a clear space round the lamp to avoid risk of fire, for an incandescent lamp under certain conditions produces heat enough to char woodwork: for the same reason lamps must be kept clear of drapery and curtains.

The following hints on the treatment of the different rooms may be of service:—

As vertical lines on the walls give the idea of height, and horizontal lines dwarf a room, so lights placed low as standards or brackets should be preferred in low rooms to pendants or electroliers hung from the ceiling.

Dining-room.—The prominent feature should be the table, which may be lit either (1) by a shaded counterweight lamp with white inside and some art shade of pink or terra-cotta outside, so that the transmitted light may give a becoming colour; or (2) by the adaptation of the candle-fittings as shown in the specimens exhibited. In the latter case the wires are distributed by a patented connector lying under the table centre, and so contrived that neither the table nor the cloth is pierced.

The rest of the dining-room should be in repose, with shaded lamps to meet practical requirements. One of the best effects produced by the writer is at Chatsworth, where powerful lamps are hidden in reflectors at the base of the pictures all round the room. This not only lights the pictures, but also illuminates the ceiling, and gives a cheerful effect without that tired feeling which is a frequent source of complaint in electrically lit dining-rooms.

Drawing-room.—This room should be the most brilliant in the house, and must be treated for ordinary use with additional lights for receptions or dances. Where possible, the writer prefers to light principally from the walls and from standards, as a top light is unbecoming to ladies, causing dark shadows under the eyes.

In order to provide for the alternative treatment required in summer and winter, a liberal use of wall attachments is recommended. Objections are sometimes raised to these on the score that they are unsuitable if the room is used for a dance, but this difficulty can be overcome by suspending side-lights from the picture rail, current being conveyed to the lamp by a silk cord lying flat against the wall.

Bed-rooms.—It is usual to place two lights near the dressing-table, and it will be found that there is considerable diversity of opinion as to the most popular treatment. In lofty rooms cords pendent from the ceiling are unsightly, although for low rooms two counter-weight pendants carefully placed will usually meet all practical requirements. An alternative treatment, which has the advantage of enabling the dressing-table to be moved or placed at an angle, consists of two jointed brackets attached to the uprights of the mirror, and carrying sliding arms capable of being raised or lowered at will. The same advantage applies to the use of two standards on the dressing-table, which should preferably be made telescopic.

CONCEALED LIGHTS IN CHINA CABINET.

ILLUMINATED OVERMANTEL.

By the bed, or in large rooms on each side of the bed, a bed-standard with a swivelling shade should be provided, with hooks in convenient positions to enable the fitting to be used as a bracket when required, the switch for this lamp being placed within easy reach.

In passages and staircases two-way switches should be fixed in such positions as will avoid the necessity of traversing any part of the building in the dark. Switches should, as a rule, be fixed near the door, and in well-decorated rooms should be sunk to render them as inconspicuous as possible, which is usually preferable to any attempts to conceal their unsightliness with ornamental covers.

Picture Lighting.—For the general illumination of the room reflectors are most useful if placed at the base of the picture, for by this means the light is thrown on to the ceiling and diffused into the room. With large pictures, however, it is frequently necessary to supplement these with a top reflector, in which case the lamp must be placed sufficiently high to prevent the reflection of the lamp itself throwing a bright patch on the picture, the angle of reflection being of course equal to the angle of incidence. Side-lights can only be used where the pictures will not be seen from any position where the lights themselves will be visible.

Before concluding, the writer wishes to make a passing reference to the improvements in gas and oil which are constantly being brought to public notice as the latest rivals of electric lighting. Statistics have shown that these are an absolute benefit to the electrical industry, for frequently the most difficult problem before the electrical engineer is to educate the conservative householder to the necessity for more light than has sufficed for his ancestors. If only he can be induced to adopt a brighter light, even if produced by one of the latest forms of gas or oil apparatus, the low initial cost of which is certainly enticing, he will never be willing to return to his former condition. Then after a short time, when the absence of oxygen, the smell, and general stuffiness have become quite unbearable to him, history again repeats itself, and one more name is added to the long list of those who use and appreciate the electric light.

II. PRACTICAL APPLICATIONS OF ELECTRICAL POWER.

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ELECTRICAL POWER is now used for such a number of purposes that in preparing a Paper on its practical applications the author, to keep the length of such a Paper within reasonable limits, must consider the particular interests of the Institute, and this has led to the exclusion of perhaps the most interesting, and certainly the most important of its applications.

Electrical traction, both on tramways and railways, the transmission of power from central stations in mines, mills, and works, are matters which fall entirely within the province of the engineer, and are only of general interest to the architect. This Paper will, therefore, to an engineer, seem somewhat like *Hamlet* without the Prince of Denmark, but the author trusts that this shortcoming will not be of such importance to the present audience.

To enumerate and describe the various practical applications of electrical power in connection with work in non-manufacturing premises would be a task sufficient to tax the patience of both the author and the audience, and would then only resemble an abstract of a number of trade catalogues. The author therefore proposes rather to deal with the general

principles underlying the application of electrical power, to describe a few typical forms of apparatus, and to discuss the question of the cost of power under ordinary circumstances.

Electrical power, generally speaking, can be applied wherever gas or steam-power can be used, and in many instances where gas or steam-power is impossible of application. It differs, however, from gas or steam in that an electrical motor is not a prime mover—that is to say, it is only an apparatus for the transformation of electrical energy into mechanical power, not an apparatus for transforming the potential energy of fuel into mechanical power. Owing to this some source of electrical power must be available before an electric motor can be used.

There is now hardly a large town in the United Kingdom in which public supply mains for electrical energy have not been laid down, in at least part of the streets; and the effect of the general demand has been to reduce the price to such a point that electrical energy can now generally compete with other forms of power. In addition to the public supply mains there are numbers of large buildings in towns which have electrical installations of their own, and many country houses have plant for the supply of light and power.

Electrical energy is supplied to consumers from the public supply stations either on the continuous or alternating current systems, but the modern tendency is to supply entirely on the continuous system, largely in view of the increasing demand for power. Generally speaking, all private installations are on the continuous current system.

The question of installing electric power in factories and such like buildings, while affecting the architect as to the arrangement of the power house, is, in the author's opinion, purely an engineering and financial one, and he has therefore not considered it in the present paper, confining himself to the applications of power to be met with in premises where the question of power is a small matter compared with the other uses to which the premises are put.

Electrical power, as distinct from lighting, in buildings for non-manufacturing purposes, can be and is generally applied to, roughly, five classes of use:—

Lifting and hoisting.

Ventilating.

Driving machinery for small trades and for domestic purposes.

Pumping.

Heating and cooking.

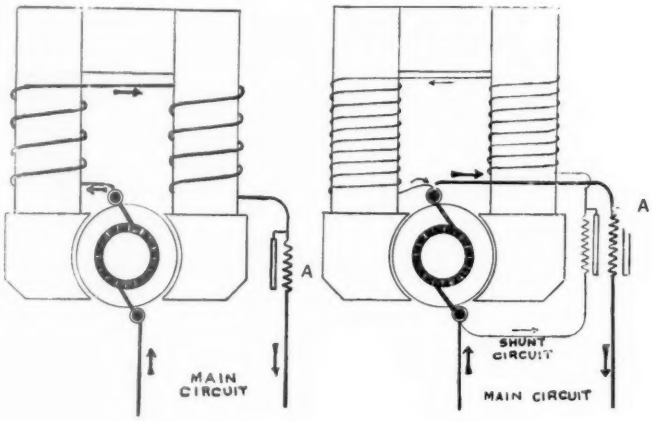
In all except the last class electrical power is applied by means of electric motors, the particular purpose for which it is to be used necessitating often special types of motors, gearing, and regulating apparatus.

Motors.

Most motors, as has been said before, are supplied from a continuous current system, the electrical pressure varying from 100 volts to nearly 500 volts, a pressure of from 200 to 250 volts being now the most usual. Motors can be and are run off alternating current supplies, but at present are neither efficient nor cheap, and although the question of alternating current motors is one of great interest to the engineer, and may possibly be of more considerable importance in the future, the author does not consider it of sufficient practical importance at the present time to discuss in this Paper.

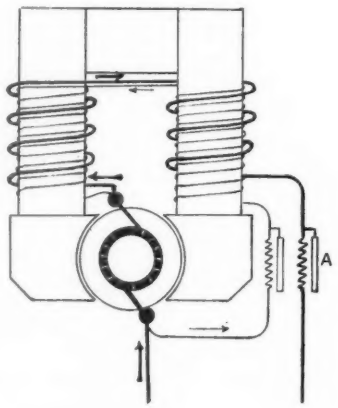
An electrical motor consists essentially of a fixed part, generally the field magnets and their coils, and a moving part, the armature, from the spindle of which the power is taken off to the machinery. Either the whole or a part of the current is carried through the coils on the magnets, and a magnetic "field" is produced in the space in which the armature is

placed. On a current being passed through the coils on the armature it is caused to rotate at a speed depending on the electric pressure at the terminals of the motor, the number of coils on the armature, and the strength of the magnetic field; the strength of the magnetic field depending on the number of coils of wire on the magnets and the current passing through them. An increase of the pressure at the terminals of the armature increases the speed, and an increase of the current in the field coils decreases the speed. An increase in the current through either the coils on the armature or magnets increases the turning effort or torque of the armature. From the above it will be seen that the regulation of speed and power in an electrical motor is carried out entirely by electrical methods, no sort of governor, as in a steam or gas engine, being usually required. All motors which are used for the purposes under consideration are usually supplied at a constant electrical pressure, and are generally made in three types to suit the conditions under which they have to work and the machinery which they drive. Where constant speed is required, what is known as a shunt-wound motor is used; in this, only part of the current is taken through the coils of the field magnets, this part of the current not passing through the armature. Where a large turning effort is required and not a constant speed, a series motor is used, the same current passing through both the field and armature coils. An intermediate type is used in a number of cases in which the magnets are wound with a double set of coils, one of which carries the same current as the armature and the other a separate "shunt" current, the proportion of the two different sets of coils being arranged to suit the work to be performed. It will thus be seen that it is not sufficient to know the power required for a particular purpose, but also the conditions of running, before selecting the type of motor required, and



SERIES MOTOR SHUNT MOTOR

A, Regulating Switches.



COMPOUND MOTOR

this selection can only be made from previous knowledge of the work or by experiment under working conditions.

The regulation of a series motor can only be carried out by variation of the pressure at its terminals, and it is done by the insertion of more or less resistance in its circuit; if such resistances are used for any considerable period, considerable waste of energy is incurred, but as series motors are used generally for lifting and hoisting, this is not of great importance.

Shunt-wound motors can be regulated by inserting resistances either in the armature circuit or in the field circuit. In the latter case practically no waste is incurred, but the range of regulation obtained is small, being about 20 per cent. in ordinary motors. It is important when ordering or arranging for motors that the whole of the conditions of working be known, so as to avoid running them with resistances in circuit when under their normal conditions of work.

The speeds of electric motors, as usually supplied, are generally high, being about from 1,000 to 1,500 revolutions per minute for sizes from one to five horse-power; but motors running at much lower speeds than this are being largely built, and it is now possible to buy motors running at speeds of from 200 to 500 revolutions per minute at reasonable prices. The use of slow-speed motors is largely increasing, the extra first cost being compensated for by the reduced wear and tear, and by the advantage gained through direct coupling the motors to the machines.

Lifting and Hoisting.—The use of electrically driven lifts and hoists has greatly increased during the last few years, even in districts, such as the Metropolitan one, in which hydraulic supply can be obtained. Speaking broadly, the machinery of an electric lift consists of a winding drum driven by an electric motor (almost always of series type) through belts or worm gearing, the cage being lifted by wire ropes on the winding drum, the electric motor being controlled by a switch for varying its speed and direction of rotation, the switch being worked from a rope in the cage as with hydraulic and other lifts. The safety of the cage is provided for as in other lifts by special mechanism, which, if the lifting-rope breaks or becomes too slack, forces out wedges or catches on the guides, holding the cage secure in position. This, however, does not provide against the failure of the electric supply, and electric lifts are generally provided, in addition, with a brake which is always on unless current is passing through the motor. Although the broad principle of electrically driving lifts is quite a simple one, the actual machinery has to be most carefully designed and arranged, special motors and switches and gear being employed by manufacturers who have had experience of lifts, as without these an electrical lift is neither efficient nor economical, the wear and tear on an improperly designed and constructed lift being very great.

Ventilation.—Electric motors lend themselves perhaps better than any other means of driving to the purpose of operating fans, whether large fans for the ventilation of a building on some complete system, or small fans for extracting the air from particular rooms, or even for stirring up the air in any room in the manner of a punkah.

Most of the makers of fans now design their fans to be driven direct by electric motors, as the high speed at which small motors must run to be economical in first cost enables the size of the fan to be reduced to a minimum, but many fans are still driven from the motor by means of belts. Considerable trouble is sometimes caused by the noise of the fan running at high speeds, and even by the hum of the motor, and these troubles are often intensified by the air shaft acting as a resonator. Special care should be taken to avoid this, and the fan

and motor should, wherever possible, be carried, not from the sides of the air trunk, but quite separately from a substantial wall. The noise, however, is often caused by the pulsations of the air set up by the blades of the fan if they are not properly shaped, and in this case little can be done except to alter the fan; sometimes, however, the note produced by the fan harmonises with the natural note of the air pipe, and in this case the noise can be reduced and even stopped by running it at a different speed.

The motor and arrangements for driving fans call for little comment, as they are usually of ordinary type, the fans used being the same, however they are driven.

It is usual to fit fan motors with switches for altering their speed to suit the conditions under which they are to run, and it is advisable to arrange the switches and their resistances so that the motor runs most economically when at the speed it is most generally used.

Pumping.—Pumps driven by electric motors are now being used for almost every purpose, even in the boiler-houses of electrical supply stations, for feeding boilers where steam is already in use, owing to their economy as compared with the usually very wasteful steam-pumps, especially when running slow. In buildings in cities, pumping plant is not as a rule much required, but there are instances in which electric pumps have been installed to pump water into high level tanks, and even to accumulators for working lifts. Electrically driven pumps are generally of three-throw type, so as to give a steady flow and so avoid hammering in the pipes, their crank shafts being driven through gearing by the motor. As motors generally run at a comparatively high speed, special care must be taken in the gearing to avoid noise, and a common cause of complaint against electrically driven pumps is the rumbling noise produced, which sometimes can be heard for great distances. This can be overcome to a great extent by the use of proper materials in the gear, or entirely by the use of worm gearing or belts, but these may be more wasteful in power than the ordinary spur gearing, unless properly designed. If the pumps have to work at various speeds, the arrangements for doing this must be well thought out so as to avoid waste of energy. If the range of speed required is great and the pump may have to work at slow speed for long periods, it may be advisable to wind the motor armature with two distinct sets of coils, and to provide arrangements by which these coils can be used either in series or in parallel with each other, thus varying the number of active coils on the armature.

Machinery.—Practically all classes of machinery can be and are driven electrically. Beyond enumerating the various machines capable of being so driven—which list would fill pages—there is little to be said as to this point. At the present time a number of printing machines are being driven electrically, as it has been found that the steady drive allows of much superior work being done at the same speed. Owing to the time occupied in "setting up" a printing machine, it is always standing a considerable proportion of its time, and as, unlike shafting, the motor uses no energy when the machine is stopped, very considerable saving can be made in the cost of power.

Many domestic machines, such as polishing machines, run at a high speed and are specially suitable for electrical driving, the machine often consisting of a simple motor with its spindle prolonged to carry a brush or polishing wheel.

Cooking and Heating.—It would appear, in view of the great number of transformations of energy from the boiler furnace at the generating station to the coils in the heating apparatus, and remembering that at every transformation there is a considerable loss, that heating by electricity could not compete in any way as to price with direct heating by means of gas

or coal; and for any purpose where a large quantity of heat is required this is quite true. As, however, most ordinary heating operations in a house are carried on under conditions in which the heat utilised is only a very small proportion of the heat generated, it is possible, by properly applying the electric energy, to use such a large proportion of the energy as heat that the competition is rendered possible when other considerations as to dirt, &c., are taken into account. Generally speaking, heating by electricity is applied by passing a current through coils of wire of high resistance; the wires are embedded in an insulating covering, and are heated, together with their covering, to the temperature required. Special precautions can be taken to prevent loss of heat, except to the material or space to be heated, and a small current, and therefore expenditure of energy, is required to keep up the temperature. Another method used for heating rooms is to pass the current through a number of glow lamps, the lamps being proportioned so that their filaments are not completely incandesced, the room then being heated by radiation as with an ordinary fire or gas stove. The lamps are arranged in special reflectors so as to obtain a "beam" of heat rays, and in the author's opinion this method of heating will be of great value, as the apparatus is simple, easily fitted and understood, and as free from risk of break-down as ordinary electric lighting apparatus. The heat obtained, being radiant heat, does not produce the enervating feeling produced more or less by all methods of heating by warming the air, and the effect produced is similar to that from an incandescent gas stove or bright red coal fire. The cost is referred to below.

Costs.

Electrical energy is charged for at a rate of so much per Board of Trade unit, a unit being an amount of electricity which will keep an eight candle-power lamp alight for about thirty-five hours. This amount of energy is equivalent to 1·34 horse-power exerted for one hour. Most public supplies charge a much reduced rate for energy used for power purposes as distinct from lighting, the charge in many cases being less than half that charged for lighting, the lowest charge for power being made by the Corporation of Edinburgh, where it is $1\frac{1}{2}d.$ a unit. In London the average charge is from $3d.$ to $4d.$

Lifts.—A passenger lift for carrying nine persons, running at a speed of 175 feet per minute, will require about 0·06 units per journey, taking the average of the day's work. This at $4d.$ per unit, which is a high figure, would be $0{\cdot}22d.$, or say one farthing. If run fully loaded, the cost per journey would be about $0{\cdot}4d.$ at the same rate. A smaller lift for six persons would require about 0·02 units per journey, or would cost at the same rate $0{\cdot}08d.$ per journey. The great advantage, in point of view of working cost, of an electric lift over an hydraulic lift is that the energy required varies with the load to be dealt with.

Ventilating.—Very few figures are available as to the cost of ventilating by electrically driven fans, and as the efficiency of such fans varies very considerably, and the power required to deal with a certain quantity of air varies enormously in each particular case, it is almost impossible to give figures of much practical use. Generally and very approximately speaking, one horse-power is required to deal with 20,000 cubic feet per minute, and this would correspond to about $\frac{3}{4}$ of a unit per hour, and at $4d.$ per unit would cost $3d.$ per hour.

Driving small Machinery.—For motors of one horse-power and under, it may be taken that one actual horse-power given off at the pulley of the motor will require the expenditure of one unit per hour. This at fifty-four hours per week and $4d.$ per unit will bring out the cost per actual horse-power per year at £48. 6*s.* It may be taken that a small gas engine of the same power, with gas at 3*s.* per 1,000 cubic feet, will cost about £20 per year for gas.

Electrical pumps have a total efficiency when well constructed of from 50 to 60 per cent., so that one pump horse-power will require the expenditure of about 1½ units per hour.

Heating and Cooking.—The author has not been able to obtain any reliable figures as to the cost of electrical heating on a large scale. An ordinary electrical radiator suitable for a small room costs, at 4*d.* per unit, from 4*d.* to 8*d.* per hour. The Dowsing glow lamp radiators require about ¼ unit per lamp, and a radiator of four lamps, which would be sufficient for a small room, would cost 4*d.* per hour at the 4*d.* rate.

The author has obtained from Mr. C. O. Grimshaw, engineer to the Westminster Supply Company, a number of figures as to the cost of cooking apparatus, and these are given in the Appendix below.

The author has given all costs of electrical energy at the rate of 4*d.* per unit, this being about the highest figure generally charged for electrical energy used for power purposes, but it is easy to reduce these costs to the particular charge made by any supply company. For private installations on a reasonably large scale, and economically worked, the cost may be taken as from 2*d.* to 3*d.* per unit.

The author would, in conclusion, draw the attention of those contemplating the installation of electrical machinery to the regulations of the various fire offices as to the use of electric motors so as to avoid any trouble after the apparatus is installed. The regulations in some cases are strict, and perhaps rightly so, as while electrical apparatus, if properly installed, is probably the safest from risk of fire, yet if carelessly or improperly arranged it may be, like a little knowledge, a dangerous thing.

APPENDIX.

COST OF RUNNING COOKING APPARATUS AT 4*d.* PER UNIT.

Description.	Capacity.	Cost per hour.	Cost for one operation from all cold.
Kettle	1½ pints	1·28*d.*	0·45*d.*
Griller	2 chops	2·24*d.*	0·53*d.*
Saucepan	2 quarts	1·6*d.*	0·8*d.*
Fish Kettle . . .	16 quarts	4·56*d.*	—
Domestic Iron . . .	Scorching paper	0·8*d.*	cost to heat up 0·13*d.*

*** The Papers were illustrated by a series of photographic lantern slides showing various electric-lighted interiors, such as Crewe Hall, Lansdowne House, and Londonderry House, treated according to the methods advocated in Paper No. I., some of which are reproduced on pages 87 and 89; and by others showing a 10 H.P. motor, a motor-driven lift and hoisting apparatus, ventilating fans driven by electric motors, electrically driven pumps, printing machinery, and polishing machine. There were also exhibited a number of fittings made expressly for electric light, together with examples of old candle fittings adapted for the same purpose, and a Dowsing glow lamp radiator in operation.

DISCUSSION OF THE PAPERS ON ELECTRICITY.

Professor AITCHISON, R.A., *President*, in the Chair.

MR. E. M. MONKHOUSE asked whether the wind-engine had ever been used in connection with electric lighting installation, except as an experiment. In summer there was very little wind, and in a shooting-box, or place of that sort, which was usually only occupied in the summer, a wind-engine would not be much good. With regard to the vibration of dynamos, that would be due more to bad belts when not properly jointed than to the balance of the armature. It was possible to get good and continuous belts without joints, and if these were used there was not so much fear of vibration. He thought Mr. Drake had made a mistake about the number of lamps that could be run for an hour by a unit of electricity—fifteen he understood him to say. [MR. DRAKE remarked that if the Edison and Swan lamps were measured, they would be found to come out at fifteen.] As regards the cost of the large installation of about 2,000 lights, it would be interesting to know in what part of the country the installation was; what was the cost of coal per ton; what the installation was, the number of hours it was running, and also the load factor. As to the amount of light abstracted by a frosted globe, which Mr. Drake put at 10 per cent., he had always understood that at least 50 per cent. was taken up in that way. In one case he had had to deal with he had great difficulty in getting arc-lamp globes that absorbed anything like as little as 15 per cent.; that was with the ordinary opaline globe; and frosted globes absorbed a good deal more than the opaline globe. The arrangement of lights in front of a dressing-glass was a very vexed question, and had not received nearly enough attention. Mr. Drake's was a highly ingenious arrangement, but ladies wanted to see their back hair as well as their faces, and some sort of arrangement of lights that could be moved forward or backward or put behind them was rather desirable.

MR. JOHN SLATER [*F.*], in proposing a vote of thanks to the authors of the Papers, said it was very striking to notice what an enormous advance had been made in electric lighting and in the use of electrical energy in the last few years. It was some seventeen years since he had first read a Paper on electric lighting before the Institute, and the difficulties of obtaining the light at that time were very considerable. A gas-engine had to be hired for the occasion, and an arc lamp was placed at the top of the dome. The late Mr. Spottiswoode lent him a few incandescent lamps, which had just been brought out by Messrs. Swan, to show what the light was capable of in small quantities. One of the most striking features of the latter part of this century had been the development in all sorts of ways of electricity, and the photographs Mr. Drake had exhibited of interiors he had lighted showed what an enormous variety of developments might be obtained in the way of lighting. For himself he certainly thought if one was able to hide the points of light altogether, and to get a sufficient amount of reflected light, the effect in any room was far better than by any arrangement of chandeliers, electroliers, or lamps of whatever kind. One does not want to look at the light itself, but at the objects which the light illuminates. In a thoroughly lighted room by daylight, a perfectly diffused light was obtained, and the object to aim at was to get by means of electricity a perfectly diffused light. With regard to what the last speaker had said about the amount of light absorbed by a ground-glass globe or a reflector, he seemed to have lost sight of the fact that however intense the point of light may be, nevertheless more available light was got from a frosted reflector than from a plain one, because it was more diffused. Although the actual light measured by the photometer might be very considerably reduced, yet, contrasting the two kinds of lamps, the actual effect was not anything like so much less from the frosted lamp as one might imagine. With regard to the radiator shown by Mr. Burstall, everyone must be very pleased to see it at work. The latest development in this as in many other cities was in the way of flats, and one of the greatest difficulties in a series of flats on different floors was arranging for the carrying of coal to the various rooms, and carrying away the ashes and dust. If a perfect system of heating could be got by means of electricity, even if it were a little more costly than gas, it would be an enormous advantage in the flats now being put up in London. With regard to other developments of electrical energy, anyone who had seen the workshops, where machines of all kinds were driven without belts, without oil, and without all the paraphernalia of steam driving, must have been impressed with the enormous advantage, looked at apart from the question of cost, that the electric-motors gave us; and with a reduction in the cost per unit, the future of electrical motive power was a very great one indeed, and more far reaching than could be foreseen at present.

MR. BERESFORD PITE [*F.*] said he should

like to have the privilege of seconding the vote of thanks which Mr. Slater had moved for the two very lucid and clear papers with which they had been favoured that evening, and for the admirable way in which those papers had been composed with a view to meeting the comparative ignorance of architects, and the difficulties they might have, as laymen, in dealing with a highly technical subject. The advantages and disadvantages of the several methods had been stated so clearly that the papers would be very useful for reference. He should like, however, to enter a decided protest against accepting the artistic effects produced and illustrated by the photographs as in any way satisfactory to the architectural mind. He was aware that the subject of artificial lighting was distinctly an artistic subject, and an artistic subject on which very little that was certain could be said. But he would like to suggest that the decidedly ingenious and highly original methods of masking lights behind carving, jamming them close up against the wall in the edge of a frieze, creating objectionable dark spots in front of pictures, and throwing violent and unnatural lights upon portions of them, must have an exceedingly unpleasant effect. He had seen it in one or two houses in the West End with very great regret, and had noted the disastrous effects artistically upon the pictures hanging upon the walls and the general effect upon the room. If their electrical engineering friends would consult painters and sculptors, they would find that there was not very much appreciation possible for the magnificent ingenuity which lighted up the wall rather than the room, and which irradiated the picture instead of the chair or the table at which they wanted to sit. His point was that the room artistically and architecturally suffered from being treated in this dramatic and theatrical and what he was inclined to call unnatural way. He would much sooner see a handsome chandelier, or an apparently grouped artistic treatment of manifestly visible lights, than the very clever, mysterious effects produced by concealed lights. He could not help suggesting that the plaster-work, which was modelled and designed for the wall, was not modelled and designed with a view of being examined under a highly powerful light at close quarters; the general effect for which the architect designed buildings for daylight would be completely lost; and he would not know how to proceed in colour relief or shadow if he were subject to a whole array of electric lights attached outside some little bit of detail which took the fancy of the owner or of the electrical engineer. With regard to motors, he would like to know the comparative prime cost of the motor itself, of a simple form, available for direct action with a fan. The comparative cost of the motor itself was a matter of some interest.

Mr. E. W. HUDSON [*A.*] remarked upon the great difference in the cost of supply per unit in Edinburgh, where it was only 1½*d.*, and in London, where 4*d.* was charged. Was that difference due to competition, or to the want of competition; or was there any other reason for it?

Mr. DRAKE, replying to Mr. Monkhouse's question about the wind-engine, said that a large wind-engine had been in operation for lighting purposes at Mr. Cadbury's house, near Birmingham, for about eighteen months. The returns showed that the number of hours during which a really useful charging current could be obtained was very much larger than many people imagined. The establishment contained about 200 lamps, he understood, which were supplied mainly by the wind-engine, although on occasions an auxiliary engine was necessary. In this instance it was estimated that the wind supplied sufficient energy to pay the interest on the first cost. Mr. Stevens was now intending to erect near Salisbury the biggest windmill made, and he (the speaker) had lately gone over the matter with him to see whether it was possible to get 40 horse-power available from it. He proposed to store the energy from the windmill in accumulators, and to transmit it all over his farm at high pressure for farming purposes, keeping a steam-engine in reserve. The results obtained from tests made by the Meteorological Society showed that the average number of hours during which a wind of over twelve miles an hour could be obtained was very considerable—he believed, something like eight hours a day. At the same time, in England a wind-engine was only useful for auxiliary purposes because of the long periods when wind was not available. If, however, it produced electricity sufficient to pay the interest on its cost, it was worth doing. He proposed to put one down at his own house shortly, to test it for himself near London. As regards vibration, that might be due to the belt as well as to bad balancing; but a bad belt would produce a slow shaking, which is quite different to the vibration due to bad balancing. The 2,000-light installation he had spoken of was at the Auxiliary Army and Navy Stores. The plant consisted of three Willans's *F.F.F.* engines and three boilers, each capable of working one engine and dynamo, and each of about 100 horse-power. The load factor was the usual one for a London central station; in the morning there were a few lights on at the Stores and in the evening a full light. The results were taken over a week by the meter reading, and were, so far as he remembered, about 3,500 units a week. With regard to frosting, a practical illustration shown, viz., two lamps of equal candle-power in two separate block boxes, demonstrated that the frosted lamp gave more apparent light than the clear glass. On the question of lighting dressing-

tables, the simple problem mentioned had been already worked out. A tall standard lamp had been designed for Lady Londonderry to throw a reflected light on the back of the head. With regard to what had been said about dramatic effects, of which one architect did not approve, this really was not the verdict of well-known artists. In the day-time they had one effect of light, and at night-time many people preferred a different one, they liked to see the good features of their rooms brought out and made objects for admiration; by artificial light their rooms were given a totally different appearance from that of daylight. At the same time, as the photographs showed, there were a large number of rooms in which the chandeliers, which his friend regarded as the only satisfactory way of lighting, were retained.

Mr. BURSTALL, replying to a question, said that a 4-horse motor would cost about £60. The prices of two motors of the same power but running at different speeds would be, roughly, in inverse proportion to their speed. As to relative prices for current, that opened up a very wide field. Edinburgh was a special case in which the installation had been extremely successful, partly owing to the very spirited policy of reducing the price as soon as possible. In London there was competition, and a big demand, and the companies get good prices as well.

Since the Meeting Mr. Burstall has kindly sent the following particulars as to the prices of motors :—

Power.	Speed.	Approximate price.
1 B.H.P.	1,100	£30
2 B.H.P.	1,000	£38
3 B.H.P.	850	£48
4 B.H.P.	800	£58

Travelling Studentship for Study of Decoration.

The Painters' Company again offer a Travelling Studentship, value £50, for the encouragement of the study of Decoration. The studentship is open to competition by students between the ages of twenty and thirty-five in any recognised school of art or other institution devoted to the study of Applied Art in any form, and situate within the limit of the larger Metropolitan postal area. Particulars are obtainable from the Clerk to the Company, Painters' Hall, 9, Little Trinity Lane, E.C.

9, Conduit Street, London, W., *24th December* 1898.

CHRONICLE.

The late Professor Hayter Lewis [*F.*].

The funeral of the late Professor Hayter Lewis took place on Wednesday the 14th inst. at St. Stephen's Church, Bayswater, and at Kensal Green Cemetery, in the presence of a large circle of his family and friends. Among the latter were Mr. Alexander Graham [*F.*], F.S.A., Mr. J. Tavenor Perry [*F.*], Mr. Fred. H. Reed [*F.*], and Mr. Charles Henman [*A.*]. The Secretary of the Institute attended the church ceremony on behalf of the Institute. It is hoped that there will be a full memoir of Professor Lewis in the next number of the Journal.

The Hon. Secretary, in making the formal announcement of the Professor's death at last Monday's meeting, referred to his long connection with the Institute, which began in 1845, when he was elected Associate. In 1852 he became a Fellow, and subsequently served as Honorary Secretary for some time. He was twice elected Vice-President, and it was perhaps only owing to his ill-health that he was not elected to the Presidential Chair.

The President: Gentlemen, I wish to move a Vote of Condolence with the family of the late Professor Hayter Lewis. You have heard that he was Honorary Secretary and Vice-President. He was always ready to give his counsel and advice on all difficult questions. I had known him for a great many years. He was a most accomplished architect, and a perfect friend and companion. I had the honour of being associated with him in looking over the papers and drawings of Mr. Wood, who discovered the Temple of Diana at Ephesus. Amongst his other claims to the notice of architects, he was the author of the treatise on 'Architecture' in the *Encyclopædia Britannica*. He has died, it is true, full of years, but during the later part of his life he was very much troubled with illness. I am sure you will all concur in passing this resolution of condolence with his family.

Mr. John Slater [*F.*]: I shall be very pleased, Sir, to second the vote of condolence. You, Sir,

have not mentioned, nor has the Hon. Secretary, one of the claims to respectful and grateful memory which Professor Hayter Lewis has upon us. Many of the members of the Institute who, like myself, have by this time arrived at middle age must remember his Professorship of Architecture at University College, in succession to the late Professor Donaldson. I attended those classes for several years, and, although I do not think that Professor Hayter Lewis was an ideal lecturer, yet I can safely say, what I believe will be borne out by every one who attended those lectures, that his one aim and his one desire were to give as much help as he possibly could to all the students of those classes. The Professorship of Architecture at University College was held, I think, for the first time by Professor Donaldson, and Professor Hayter Lewis succeeded him. Many of us in this Institute have reason to remember with gratitude the help that we received from Professor Hayter Lewis while he occupied the chair at University College.

The resolution, as entered upon the Minutes [p. 104], was then read by the President, and carried in silence.

The recent New York Fire.

Mr. W. Wonnacott [*A.*] makes the following interesting communication :—

I have received a few notes from a friend in New York who has had an opportunity of examining the ruins of the building recently burned down, owned by Messrs. Rogers Peet & Co., and of its sky-scraping neighbour the Home Life Insurance building. The loss and damage amounts to $750,000, and is amply covered by insurance, distributed among forty or more companies. It has been declared by experts who have seen the buildings concerned, on their periodical visits of inspection, that the fire was the work of an incendiary, and originated in the basement of the Rogers Peet building, where nothing of an inflammable character was stored, or allowed to collect there.

My friend gives a vivid account of the progress of the fire, and of the wrecking next day of the burnt out building. He witnessed a fall of coping from the thirteenth storey, the large blocks striking a balcony at the fifth-floor level, and breaking through it as if it were a cobweb construction. As the gentleman I speak of, a professional colleague, is visiting New York in order to study fireproof construction there, he took the opportunity of accompanying one of the experts engaged in inspecting the ruins, who had to report to his bureau in another city of the States. He refers very emphatically to the value of the party-wall of the Rogers Peet building in preventing the further spread of fire down the side street. This party-wall divided the premises, and was carried to a height of *several feet* above the roof, thus forming a veritable bulwark against the lateral spread of the fire, and saved the western half of the building. But upwards, where the fire could rage unchecked, he found that portions of the neighbouring Insurance building had apparently been in the fiercest part of the fire, particularly the court or light well.

The steel skeleton of the structure has apparently suffered not at all, but its stonework facing has stood the effects of fire and water very badly : the wall facing the burnt-out building is practically ruined, and it was thought by the experts that the mutilation would have been greatly diminished had brick or terra-cotta been used instead.

The iron struts across the light well were sadly twisted and buckled, while the iron mullions of the windows opening on to the internal court, which were not protected in any way, were on nearly all the floors bulged outwards, and the ironwork frames of the windows themselves seriously damaged and bent by the intense heat.

Internally there was very great damage done ; but none of the iron-framed floors appear to have suffered in any way, except that the floor girders in some instances are exposed on the underside, where the concrete has dropped away from the wire lathing ; but the brick and concrete arches between the beams remain practically intact.

The main stanchions carrying the heavy floor girders were in every case protected with terra-cotta blocks, and these did good protective duty where the fire was fiercest : though badly cracked, and occasionally broken away from the stanchions they protect, the latter appear to be quite uninjured.

But the singular damage to the internal fireproof partitions was almost universal. None of them were stayed by iron uprights, and none were of fire-resisting construction above a height of five feet from the floor, the remainder of their height being glass, or wooden movable shutters, and sashes, for the double purpose of lighting the internal passages and of allowing through ventilation in the summer. Nearly all these partitions were overthrown by the heat ; certainly no water came near those on the upper floors, *i.e.* above the eleventh story. Though numerous small fires were constantly breaking out on these higher floors, they were allowed to burn out, it being useless to attempt to reach them with the hose.

Such are briefly the important results upon the construction of this exceedingly costly fire-resisting building ; of the Rogers Peet building itself, where the fire originated, nothing remains.

The Fire Department was seriously handicapped by the excessive height of the Home Life Insurance building. Its failure in the present instance will probably hasten forward the scheme for an auxiliary high-pressure water supply that has been under consideration for several years ; and it will

also probably bring New York into line with all the other cities of the States by the passing of stringent regulations as to the height of buildings, and possibly the reduction of the height of some of the existing business premises.

The bill prepared by the American Institute of Architects, and presented at Albany, still remains on its shelf. This bill was unanimously approved by the architects practising in the city. Perhaps the most valuable result of the fire described above will be the resurrection of this bill and its addition to the statutes.

Fireproof Construction.

No. 12 of the Publications of the British Fire Prevention Committee, edited by Mr. E. O. Sachs, is entitled *The Effect of Fire*, and comprises a Report on the Horne Building Fire, Pittsburg, U.S.A., drawn up by a committee of experts for the purposes of the insurance offices pecuniarily interested. The report has been carefully framed, and is elaborately illustrated with diagrams. Bound up with it are a number of photographs showing the condition of various parts of the building after the fire. A description is given of the general effects of the fire on walls, columns, girders, and beams, and results of tests of portions of the injured steel-work. The lessons taught are thus commented on in the report:—

1. In buildings of about this height the distortion of the steel framework due to the heat of the fire cannot in any instance be sufficient to work any serious damage; nor is it probable that at any time would connection rivets be sheared off. This conclusion is arrived at for the reason that there is no probability that any future fire will be fiercer than the one at issue.

2. The method of fastening fireproofing to the underside of beams with sheet-iron strips should be discarded.

3. It cannot be too often reiterated that open front buildings like this should be protected from external fires by metal shutters, and also that all shafts should be provided with metal doors which can be readily closed at all floors.

4. The most important lesson taught by this fire was the lack of strength developed by the fireclay fireproofing. The building was permitted to move in any direction without any material restrictions by the fireproofing. The floor arches showed by the scaling off of the lower webs that they were unable to offer any sufficient force to counteract the tendency to lateral motion.

5. The column protection, although composed of the very best obtainable kind of fireclay tile, was also not of sufficient strength.

In our opinion it would have been necessary to dismantle the whole steel framework had this structure been fourteen or fifteen storeys high. The leaning at that height at the same proportion as developed would have entailed the necessity of taking the whole structure down.

Owing to the fact that steel columns or girders or beams after being subjected to a long-continued fire will assume the same temperature as fireproofing, and owing to the fact, furthermore, that the rate of expansion of the steel is much greater than that of the fireclay tile, destructive movements are permitted which, as shown in this experience, will result in considerable damage, and which damage will increase in direct proportion to the height of the building.

In view of these important developments, it is our opinion that important structures of this class should have a radically different method of fireproofing. The fireproofing should be in itself strong and able to resist severe shocks, and should, if possible, be able to prevent the expansion of the steel-work.

There seems to be but one material which is known that could be utilised to accomplish these results, and that is first-class concrete. The fire-resisting qualities of properly made concrete have been amply proven to be equal to, if not better than, fireclay tile, as shown by the series of tests carried on by the building department of the City of New York.

From the experience gained in street railway construction in laying continuous rails, it is to a large degree possible to prevent the metal from expanding. In street railway work this has been accomplished merely by the adhesion of the pavement to the side of the rails. In building construction the same results could be obtained by encasing the columns and girders with concrete placed directly against the steel-work. The adhesion of the concrete would to a large degree prevent unequal expansion of the concrete and steel. The floor arches should also be constructed of concrete, but of sufficient depth to be able to resist lateral forces. With the prevention of injurious expansion, and the protection of columns with materials that can stand severe shocks of any nature whatever, the modern steel frame constructed building would be more thoroughly protected against any fire.

The construction herein suggested should not materially increase the cost of construction. The solid concrete about the columns would add strength to same, and could no doubt be made self-supporting. The same could be said of concrete surrounding beams and girders, as has been amply demonstrated by the strength developed by concrete iron constructions such as the Monier and Melan arches.

One of the objections that would be raised against this construction would be that it could not be carried on in freezing weather. This is a proper objection, but there is no valid reason, in our opinion, why these structures should be built in winter any more than were the old-time brick structures.

As so-called fireproof buildings are not equally and to the same degree protected against fire, we would recommend to the insurance companies that they should vary the rate of insurance for this class of building, depending upon the character of the fireproofing used. The competition between fireproofing companies has been so severe as to reduce the price of their output in very many instances at the expense of quality. The large fire loss in the Horne building would still have been larger had the fireproofing been of poor quality; and we would further recommend that the insurance companies have prepared standard specifications governing the character of the fireproofing and the construction and putting up of same, and requiring owners of buildings to use fireproofing subject to these specifications under careful inspection, or be subjected to higher insurance rates.

The Protestant Cemetery in Rome.

The following letters have been addressed to the Secretary by Professor Lanciani [*Hon. Corr. M.*], of Rome, and Mr. J. Tavenor Perry [*F.*] respectively. Mr. Perry's reply refers only to the first of the learned Professor's letters. The plan is reproduced overleaf, *italics and dotted lines* representing the proposed improvements. The matter is at present under the consideration of the Art Standing Committee:

Rome, 2 via Goito: 27th Nov. 1898.

"DEAR SIR,—I am glad to inform you, in answer to your kind letter of Nov. 22nd, that there is not a particle of truth in the report that the municipal authorities of Rome contemplate the destruction of the Protestant cemetery by the Porta S. Paolo by cutting a broad straight street across it, or by other means.

"The municipal authorities proposed in 1887 (and the State sanctioned) a scheme for improving the traffic at the Porta S. Paolo. The necessity for this scheme was evident, because an industrial quarter of some importance had sprung up outside the gate, and the population of the suburb crossed by the Via Ostiensis had quadrupled since 1870. Here is a rough sketch of the scheme [*see plan*]. The traffic between city and suburb had to be carried through a (double) gate, only 9 ft. wide, the next gate on the left (S. Sebastiano) being 1,795 yards distant.

"The city proposed to open two avenues—one from the Marmorata side, one from the S. Gregorio side, which would meet at the gate. Here they would form a square about 250 × 250 ft., in the middle of which, and surrounded by old pines and cypresses, would stand the pyramid of Cestius, the double gate of Honorius, the postern of the Jubilees and Aurelian's wall connecting the pyramid with the gate—a monumental and historical group of incomparable beauty and interest.

"The scheme necessitated on the other side two little losses—the cutting of a passage through the walls on either side of the monumental group, and the removal to a safe distance of three tombs which stand at the easternmost extremity of the Protestant cemetery, next to the pyramid of Cestius.

"The removal of the three tombs to a little distance from their present place was duly arranged between the municipality and the (German, I believe) Embassy, which represented in this case the joint interests of the foreign colony.

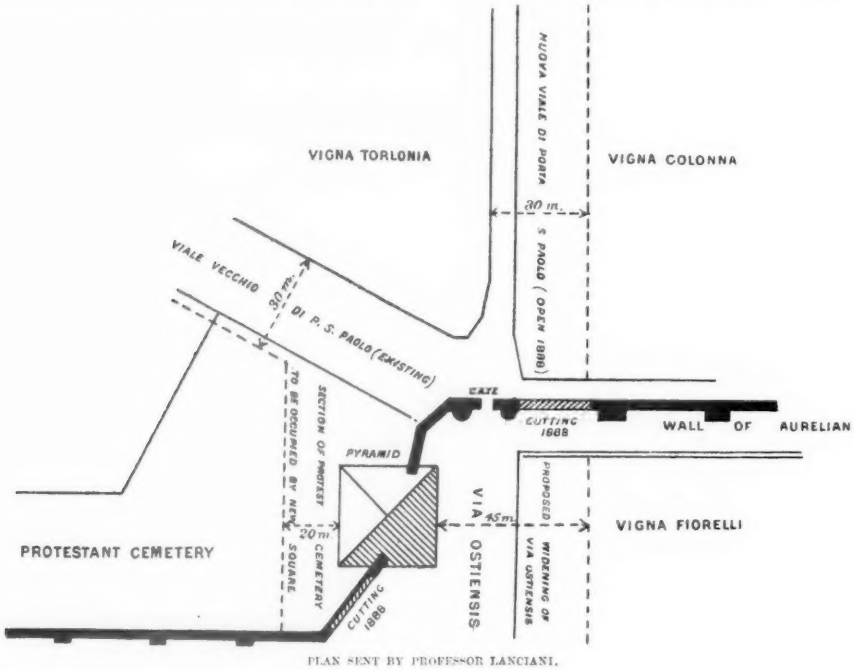
"The crisis of 1888 has left the scheme unfinished; the two avenues have been opened, the walls have been cut, but the transportation of the tombs and the general arrangement of the square are still to be carried into execution. Considering the present state of affairs, I suppose that many years will pass before this part of the *piano regolatore* will be taken up again.

"No other streets or roads are contemplated in the neighbourhood of the cemetery. This cemetery forms a parallelogram 286 yards long, 42 yards wide = 12,000 sq. yards. The section which will be eventually cut off for the purpose described above measures about 42 × 20 = about 800 sq. yards.—Believe me, truly yours,

"Prof. RODOLFO LANCIANI."

A postcard from Professor Lanciani, dated the 29th Nov., continues:

"Let me add to my declaration of yesterday



PLAN SENT BY PROFESSOR LANCIANI.

two other statements. 1st, That in the convention of 1888 it was agreed that the tomb of Keats and the two others should not be removed at all. They will continue to stand where they are at present, shaded by the same trees. 2ndly, That the sole representative of foreign interests in the Protestant cemetery by the pyramid of Cestius is the German Embassy. The English and American colony is simply allowed to make use of the cemetery by its legal owner, the German Embassy. R. LANCIANI."

Mr. Tavenor Perry writes:—

"25, The Grove, Boltons, S.W.: 3rd Dec. 1898.

"DEAR MR. LOCKE,—Herewith I return Professor Lanciani's letter, and am much obliged to you for lending it to me. The Professor's apology does not seem to me to be quite satisfactory, and I would suggest that his plan should be published in our JOURNAL, to elicit the criticism of some of our members best acquainted with this quarter of Rome. For the widening of the roads, &c. on the east side of the pyramid already accomplished the increase of traffic may be a reasonable excuse, but for the new road on the west side there is no excuse to be found whatever, as the road would turn almost at right angles out of the Marmorata and lead to nowhere when outside the walls. The main idea seems to be to 'open up' the group of buildings composed of the P. Ostiensis and the tomb of Caius Cestius much as other unfortunate ruins in Rome have been opened up to their utter spoiling, such as the Minerva Medica, the Auditorium of Mæcenas, and many others. The effect which will result from this can be seen in Plate 5 of Parker's *Tombs In and Near Rome*, which is evidently a photograph taken from under the trees, and shows absolutely the appearance which will be presented by the tomb towards the new road. On page 22 of Wey's *Rome*, English translation, is a view showing the pines and cypresses which will have to be sacrificed to allow of this so-called improvement. The loss that Rome has sustained of late years from the reckless way in which trees have been wantonly destroyed can be well appreciated by reading the Professor's own remarks on this subject in his *Ruins of Ancient Rome*, page 418, and seeing the view he there publishes of a group of pines in the Villa Ludovisi, cut down in 1887.

"We may all feel strongly on the sentimental side of the question—the fact that the cemetery to be in part destroyed is mainly English, and among the tombs to be disturbed are those of Keats and Bell—and for these reasons our objections may be regarded as prejudiced; but all architects and artists will agree that a grave blunder would be perpetrated if, for the sake of some fancied improvement, one of the most picturesque corners of Rome were destroyed and valuable monuments endangered; and it is a scheme against which our Institute should most strongly protest.—Faithfully yours, J. TAVENOR PERRY."

Protection of Florentine Monuments.

The petition issuing from the Society for the Protection of Old Florence, to which attention has been called in the current volume of the JOURNAL [p. 48], has been signed by a great number of architects both in London and in the provinces, copies having been sent to the Hon. Secretaries of the Allied Societies. It still lies at the Institute for signature, but it must be sent in to the Society by the 24th inst.

A courteous letter from the Marchese Torrigiani, Syndic of Florence, appears in *The Times* of 15th December, protesting against the suspicions implied, and stating that neither the Ponte Vecchio nor the houses on it have been threatened at all. The only changes contemplated were the sanitation of the slums between Borgo San Jacopo, Sdruccioli dei Pitti, Via Maggio, and Via Guicciardini, and the building of a short colonnade between Pieta Rossa and Piazza san Biagio, being "merely the end of the work of resanitation of the part of the city formerly called the *centro*."

The same issue of *The Times* contains a counterblast by "Vernon Lee," who is in charge of the English and American petition. She refers to the vandalism of the commune in the demolition of the slums of the *centro* some years ago, and points out that the Marchese Torrigiani cannot bind the syndics who follow him, the office being temporary; and that, even if he could, the votes of the citizens could easily overpower their authority, as they did that of Prince Corsini, who was syndic during the demolition of the *centro*. "Vernon Lee" therefore urges sustained efforts on the part of lovers of old Florence, in spite of the syndic's protest.

Professor Ussing's Pamphlet on Vitruvius.

A translation, supervised by the author, of Dr J. L. Ussing's *Observations on Vitruvii de Architectura Libri Decem, with special regard to the time at which the work was written*, has been printed by the Institute, and is now on sale at the price of 2*s*. 6*d*. There is a special note on the cover to the effect that the Council, while thinking it desirable to print this translation, take no responsibility for the conclusions arrived at. An article on Professor Ussing's pamphlet by Professor G. Baldwin Brown [*H.A.*] will, it is hoped, appear in the next issue of the JOURNAL.

Memorial to the late Charles Garnier.

The following letter has been received by the Secretary from the Société Centrale des Architectes Français:—

Paris, le 22 novembre 1898.

MONSIEUR,—Le Comité constitué pour élever

un monument à la mémoire de Charles Garnier, s'est réuni à l'Opéra, le samedi 5 novembre.

Dans cette séance, il a constitué son bureau de la manière suivante :

MM. Georges Leygues, ministre de l'Instruction publique et des Beaux-Arts, président d'honneur ; Alfred Normand, membre de l'Institut, président de la Société centrale des Architectes français, président ; Henry Roujon, directeur des Beaux-Arts, et Francisque Sarcey, homme de lettres, vice-présidents ; Gustave Larroumet, membre de l'Institut, secrétaire perpétuel de l'Académie des Beaux-Arts, secrétaire ; Bartaumieux, trésorier de la Société centrale des Architectes français, trésorier.

Le Comité a décidé que le monument serait élevé dans l'enceinte de l'Opéra sur la façade latérale, côté de la rue Auber, où se trouve la bibliothèque. L'architecte désigné est M. J.-L. Pascal, membre de l'Institut.

M. le Directeur des Beaux-Arts a donné spontanément au Comité l'assurance que le concours de l'État ne ferait pas défaut à son œuvre. De leur côté, MM. les directeurs de l'Opéra, pour associer étroitement leur théâtre, son public et ses habitués, à l'hommage que va recevoir la mémoire de Charles Garnier, ont décidé, d'accord avec MM. Paul Vidal, Emile Bergerat et Sainte-Croix, que le produit de la répétition générale payante de Gautier d'Aquitaine serait attribué à la souscription.

Mais, en raison des frais considérables qu'exigera un monument digne d'un tel objet et de l'emplacement choisi, le Comité compte principalement sur le résultat des souscriptions individuelles. Il a la ferme confiance que les confrères et les amis de Charles Garnier tiendront à honneur de réunir leurs efforts, afin d'attester leur admiration et leur affection pour le grand architecte.

Le Comité a donc l'honneur de vous adresser ci-jointe une liste de souscription et vous prie de la retourner, avec le montant des sommes recueillies, à M. Bartaumieux, trésorier, rue la Boëtie, 66.

En outre, les souscriptions individuelles sont reçues à Paris :

A la Société centrale des Architectes français, 168, boulevard Saint-Germain.

Chez M. Bartaumieux, trésorier du Comité, 66, rue La Boëtie.

A la librairie Hachette et Cie, 79, boulevard Saint-Germain.

A la caisse du théâtre national de l'Opéra.

Veuillez agréer, Monsieur, l'assurance de nos sentiments les plus distingués.

Le Président du Comité, Membre de l'Institut. Président de la Société centrale des Architectes français,	Le Secrétaire du Comité, Membre de l'Institut. Secrétaire perpétuel de l'Académie des Beaux-Arts,
ALFRED NORMAND.	GUSTAVE LARROUMET.

The Committee is a numerous and very representative one, composed of eminent Frenchmen distinguished in letters, science, or the arts. The only non-Frenchman on the committee is the President of the Royal Institute of British Architects.

The President last Monday announced that the Council had voted £10 to the memorial, and that he would be happy to receive further contributions and forward them to the Committee in Paris.

MINUTES. IV.

At the Fourth General Meeting of the Session, held Monday, 19th December 1898, the President, Professor Aitchison, R.A., in the chair, with 20 Fellows (including 10 members of the Council), 27 Associates (including one member of the Council), and several visitors, the minutes of the Meeting held Monday, 5th December 1898 [p. 80], were taken as read and signed as correct.

The following members attending for the first time since their election were formally admitted and signed the respective registers—namely, Henry Thomas Hare, *Fellow*, and Percival Cherry Blow, Arthur William Vercoe, and Christopher William Surrey, *Associates*.

The decease was announced of Henry Bridgford, of Manchester, *Fellow*, and of Professor Thomas Hayter Lewis, *Fellow*. Reference having been made to Professor Hayter Lewis's long and intimate connection with the Institute, to his high personal qualities, and to his services as Professor of Architecture at University College, on the motion of the President, seconded by Mr. John Slater [*F.*], B.A. Lond., it was

> RESOLVED, that the Royal Institute of British Architects desires to express its high estimate of the valuable and productive labours of its late distinguished Fellow, Professor Thomas Hayter Lewis, in furtherance of the advancement of architecture, and of the eminent services he rendered the Institute as Member, as Honorary Secretary, and as Vice-President ; and that the Institute do record its sense of sorrowful regret at the loss it has sustained by his death, and do offer to his family an expression of sympathy and condolence with them in their bereavement.

The following candidates for membership, found by the Council to be eligible and qualified according to the Charter and by-laws, and admitted by them to candidature, were recommended for election—namely, As FELLOWS, George Hornblower [*A.*, qualified 1888] and Henry Hoyne Fox [*A.*, qualified 1887] ; as ASSOCIATE, John Alfred Jones, jun. [*Assoc.* 1888-92].

The President announced that the Council had voted the sum of £10 to the fund which was being raised for the memorial to the late M. Charles Garnier.

Two Papers—namely (1) SOME PRACTICAL HINTS ON THE PRODUCTION AND USE OF ELECTRICITY FOR LIGHTING COUNTRY HOUSES, by Bernard M. Drake, M.I.E.E., and (2) PRACTICAL APPLICATIONS OF ELECTRICAL POWER, by H. R. J. Burstall, M.Inst.C.E.—having been read by their respective authors and illustrated by lantern slides and an exhibition of fittings and appliances, a discussion ensued, and a vote of thanks was passed to the authors by acclamation.

The proceedings then terminated, and the Meeting separated at 10.20 p.m.

Obituary.—Notice has just come to hand of the death of Mr. Thomas Lainson, of Brighton, which occurred on the 18th May last. Mr. Lainson had been a Fellow since 1877.

THE BIRMINGHAM MEETING AND ANNUAL DINNER.

The first item in the programme of the Birmingham meeting on Friday, the 9th December, was the inspection of the new General Hospital. In the absence of Mr. Henman, who had counted upon conducting parties over the building, the Governor of the Hospital, Dr. Way, explained the arrangements to a large number of London and non-Birmingham architects.

At 5 o'clock, Mr. W. M. Fawcett, Vice-President, taking the place of the President, who was most unfortunately prevented by illness from attending the meeting, held a reception at the rooms of the Society of Artists, kindly placed at the disposal of the Institute. After the reception a general meeting was held, at which the following paper was read :—

BUILDING BY-LAWS AND THEIR ADMINISTRATION.

By William Henman [*F.*].

Before entering upon the subject of "Building By-laws and their Administration," respecting which I have been requested to make a few remarks preliminary to the discussion which it is hoped may follow, permit me to express my satisfaction that the Institute has determined to hold such gatherings as this from time to time at the centre of one or other of the Allied Societies, and to offer on behalf of the Birmingham Architectural Association a hearty welcome to all who have come to take part in this meeting.

It seems to me most appropriate that at these business meetings held in the provinces, subjects which principally affect the daily work and status of architects practising outside the Metropolitan area should receive consideration. Time at disposal would be too short for full discussion of subjects connected with the higher branches of our art, and is in fact barely sufficient to give even a general idea of the difficulties surrounding a subject such as I have to bring to your notice; but it may, I trust, be enough to indicate the widespread feeling that building by-laws and their administration throughout the country are in a most unsatisfactory condition. Unless members of our profession can bring united pressure to bear upon the responsible authorities, the evils under which we have so long suffered may extend, and cause in the future still greater annoyance and irritation to architects, as well as injury and loss to the public.

It will be understood from the foregoing that the Metropolis is purposely excluded from present consideration, the reason being that the Building Act applying thereto has recently been revised, and because it is administered by an experienced body of men, who, I believe, are generally architects or have had an architectural training, in addition to which there is power of appeal to the London County Council.

I pronounce no opinion, therefore, either upon the new Metropolitan Building Act, or upon its administration, but desire to direct attention to the fact that outside the operation of that Act an entirely different state of affairs exists.

Under the Public Health Act of 1875 district authorities are empowered to make by-laws and building regulations subject to the approval of the Local Government Board. Some latitude in a few special particulars to meet local requirements may be necessary and advisable; but when every district authority is allowed to make all sorts of petty variations, confusion results, and architects who have works to carry out in several, perchance adjoining, districts are often caused the greatest annoyance and inconvenience by having plans disapproved in one district which would be passed without question in another; and this frequently results from the interpretation different surveyors may put upon the same by-law or regulation. Some local authorities make regulations simply by resolution of the board, which they do not even print or circulate, and endeavour to enforce observance thereof without having secured the approval of the Local Government Board.

It may, I hope, be taken for granted that architects as a body have not the slightest desire to evade or obstruct any by-law, or even any regulation lawfully made with the object of securing safety and health, provided such by-law or regulation is uniformly and reasonably enforced.

Most of the difficulties, annoyances, and petty irritations principally arise because those in authority too often lose sight of the one and only object for which building by-laws and regulations are necessary, viz. to secure safety and health to individuals and communities.

The so-called Model By-laws of the Local Government Board were doubtless framed with that object, but they are confused in arrangement; they go too much into detail on matters of minor importance, respecting which knowledge is yet imperfect, and omit reference to matters of structural importance, the neglect of which in some buildings may be a definite source of danger. Moreover, they are wrapped up in a vast amount of unnecessary legal jargon and excessive verbiage.

On these really far from model by-laws, those of district authorities are framed, but each with numerous variations even in neighbouring districts; reference to any particular subject is rarely assisted by suitable headings, marginal notes, or index. Special Acts of Parliament, promoted by local authorities for entirely different purposes, frequently have clauses slipped into them which

either extend or repeal portions of building by-laws previously in force, and it rarely happens that such provisions are properly set forth in the printed matter issued as the Building By-laws of the district. All this is bad enough, but difficulties are increased by the uncertain methods of administration.

Apart from the larger cities, provincial district surveyors are usually selected from a class of men trained to road surveying and sewer laying, with little knowledge of building construction, and less of architectural propriety. Brought up in the offices of district surveyors, they appear to imbibe the idea that architects are their natural enemies, and that their duty consists in devising means for wasting their time and causing them unnecessary trouble, quite regardless whether by so doing the safety or health of any individual may be secured.

In populous districts the surveyors are assisted by building inspectors, with, as a rule, even less knowledge and discretion. So that instead of inspection and regulation, such as I take it the law intended, there is frequent dictation and undue interference.

One class of property, for which well-devised building regulations are required, viz., dwellings for the working classes, are still erected in the most flimsy fashion by the jerry-builder, who generally goes scot-free, while architects who desire to build scientifically and well are continually harassed by unreasonable restrictions and requirements under cover of a questionable by-law.

The reason for this is not far to seek—too many members of district councils are interested directly or indirectly in building operations; the surveyor can serve such in many ways, and in turn obtains their support. Inspectors are but mortal, and generally underpaid; it is therefore not surprising that some of them come under the influence of the speculative builder. Little credit accrues to them by drawing attention to his irregularities, but *éclat* is gained when an architect is reported as having contravened, even the letter of a by-law or regulation.

Strange to say, the architect has no redress whatever; the surveyor is all potent; for even if the committee are permitted to be approached, they generally support the action of their surveyor, and the Local Government Board proclaim their inability to interfere. Resistance to unreasonable demands simply engenders greater exactions, so that, more often than not, architects give way simply for the sake of peace and quietness.

Another side of the question, particularly in large towns and cities, seriously affects every class of the community. Year by year district authorities are grasping at greater powers of control, ostensibly for the public good. Local Acts are slipped through Parliament. By-laws and regulations are made, many of which seriously trench on the rights of property and of individuals, or by which the cost of building is seriously and unnecessarily enhanced.

In order to counteract these evils, members of our profession must act together, and strive to obtain the co-operation of building proprietors by letting it be known through the public press that action is being taken, in the hope of regulating local authorities and their officials within reasonable limits. Pressure must also be brought to bear upon the Local Government Board, so that Building By-laws may in all essentials be uniform, and that only such regulations may be sanctioned as are proved to be necessary to secure health and safety. In addition to this, courts of appeal, easily accessible, should be constituted.

Although but indirectly connected with our subject, I take this opportunity to draw attention to the employment of district surveyors in carrying out buildings of architectural character, such as infectious hospitals, baths, libraries, markets, and even town halls and council houses. Rarely have they received suitable training to fit them for undertaking such works, and in doing so architects are deprived of legitimate employment for which many of them have spent years of study and gained practical experience.

Why district surveyors should be so anxious to undertake the carrying out of work additional to their ordinary duties may at first sight appear unaccountable, but I have had opportunities for watching the process, and seen the results.

As previously mentioned, a surveyor often makes himself useful to members of his board; then when a building is required, it is suggested that an architect's fees may be saved by employing a salaried servant—this appears so plausible to the average district councillor that it is not surprising the surveyor is entrusted with the work. He then obtains the services of some architectural hack, who prepares the design. The work proceeds. Mr. Surveyor then suggests that, in consequence of the labour involved, he should receive extra remuneration, which generally takes the form of a rise in his salary, and often the "temporary" hack becomes a permanent addition to his staff; so that the ratepayers, instead of simply having to pay an architect the usual five per cent. on the cost of the work, are saddled with an annual charge, which in the aggregate largely exceeds the legitimate fees for the carrying out of the work. In addition to which it is a well known fact that the actual outlay on buildings carried out under the control of surveyors generally is far in excess of what it would be in the hands of a qualified architect, so that not only do members of our profession suffer, but the public have to bear the excessive cost, and the buildings lack architectural character and usefulness.

In some districts surveyors are permitted to undertake private work. They prepare designs in the public offices with the assistance of their staff; necessarily those designs are passed without question; and I have even heard of difficulties being thrown in the way of building proprietors and architects, evidently for the purpose of diverting work into the hands of the surveyor.

These are crying evils, which it is to be hoped the Institute will take up and exert itself to remedy; it is one way in which it may demonstrate its power for the good of the profession and benefit the public. Such useful action is, in my opinion, the best means to adopt for the extension of its influence, and the increase of its membership throughout the country.

DISCUSSION ON MR. HENMAN'S PAPER.

Mr. WILLIAM WOODWARD [*A.*], said that the difficulties Mr. Henman spoke of with regard to building by-laws and their interpretation were applicable equally to London. In London, however, there existed a Tribunal of Appeal, consisting of two architects and a lawyer, empowered to deal with questions arising under the London Building Act.

Mr. T. NADEN said that in Birmingham their appeal was to a committee of the Council. He had experienced no difficulty with surveyors. They had only to stroke the surveyor the right way to get what they wanted, and the committee need only be appealed to when the surveyor considered that the by-laws were not sufficiently elastic to meet a special case, and could not take the responsibility upon himself.

Mr. J. C. NICOL [*A.*] said that in his personal experience the surveyors were not so very bad to deal with. The architect, if he went about it the right way, generally got his own way in the end.

Mr. W. MILBURN said that in Sunderland they had a set of unsuitable by-laws, framed by the Corporation, and the architects got up an agitation, in which they obtained the assistance not only of the builders, but of the leaders of the workmen's societies. The result was that they got the by-laws amended.

Mr. JOHN COTTON [*F.*] said the subject of Building By-laws—which were the rules and regulations under which they as architects largely worked—was a most important one for consideration, and Mr. Henman was to be thanked for bringing it forward. He could not, however, quite agree, if he interpreted the paper aright as applying generally, that it was desirable for exactly the same rules to prevail in country towns as in large towns and cities, where the conditions were different, and where, of course, there was liability to greater disaster from fire. By-laws should vary to suit varying local conditions and sites, and be adaptable to brick, stone, or timber districts, for instance, and to the class of building proposed to be erected. Laws which might be well enforced in the case of large and important town structures would be excessive and prohibitory in the case of country cottages. As architects they would agree with him that the great charm of our country towns was the picturesque irregularity and diversity which existed; caused by bay and oriel windows, overhung gables, and such-like projections, and the introduction of timberwork. The charm of these features the by-laws enforced in many country towns would tend to prevent, with the result that in time our country towns would have their streets flattened out in the utterly dreary and monotonous manner of those in suburban Birmingham and Manchester. This they, as presumed lovers of their country and of the beautiful and picturesque, should protest against and strive to obviate. The solitary architects in country towns could of themselves do little or nothing against this levelling and forbidding system, often sanctioned unwittingly by urban councils adopting by-laws without due consideration, or on the recommendation of a sanitary surveyor oblivious of everything except smells. He would suggest that provincial architectural associations should call into consultation with them the architects and surveyors from surrounding districts with a view to promoting an agreement as to what by-laws were most appropriate to such country districts. Perhaps, as uniformity was desirable in such laws as far as possible, and not difficult in essentials to obtain, each county or group of counties similarly circumstanced could have its particular code. This would prevent every little town having its own special variety, to the confusion of architects and builders. He quite agreed, though, that in the case of large cities like Birmingham and its *connected* suburbs one code of by-laws should rule, as small variations were unnecessary and troublesome.

Mr. P. GORDON SMITH [*F.*] said that, Birmingham having special powers under the Consolidation Act, the suburban districts could not exactly copy its by-laws. He thought, however, that it would be a very great advantage if all the local authorities in the neighbourhood would meet in Birmingham and form a committee to go into the whole subject, with the view of framing a uniform code of by-laws. They might, perhaps, get the assistance of some one from the Local Government Board to point out to them what they could or could not do. He was sure that the representatives of such a conference would receive the utmost consideration from the Local Government Board. As to the "regulations" of which complaint had been made, a district council could make what regulations it liked, but it could not enforce them. There was no penalty. As for the Model By-laws, the Local Government Board could not compel the adoption of any one of them. These by-laws

had stood the test of the courts very well, but if their phraseology were obscure there was no objection to the local authority printing explanations or illustrations with them. As for the surveyors, he had found them excellent officers and very amenable to reason. In many of the large towns the surveyors were splendid men.

The CHAIRMAN thought it desirable that the Birmingham architects should take a leaf from the book of their Sunderland colleagues.

Mr. J. SMITH (Sheffield) said that in his town work to the amount of a million and a quarter was being done from the surveyor's office.

A MEMBER suggested that if they took this point up they would be open to the accusation of thinking about their personal interests rather than the public good.

Mr. A. E. SAWDAY [*F.*], President of the Leicester Society, thought they need not be too thin-skinned on this question. It had been taken up in Leicester, and as the result of representations to the Town Council a resolution had been passed by that body that for all architectural work over a certain amount an independent architect should be engaged.

On the motion of the CHAIRMAN, the following resolution was unanimously adopted:—

> "That the Institute is in sympathy with the action that is being taken by the Birmingham Architectural Association as to the framing and administration of by-laws in Birmingham and the surrounding district, and will be very pleased to assist the local society by advice or suggestion in their action."

Mr. WM. HENMAN writes in a letter to the Secretary dated 15th December:—

"Unfortunately I was detained in London on the 9th inst., and could not be present at the meeting at Birmingham when my paper on Building By-laws was read, and therefore could not reply to the discussion thereon.

"In the first place, it is unfortunate that in the circular sent out it was stated that my paper would deal with the Birmingham by-laws, whereas I dealt with *all* provincial by-laws; because the object I had was to direct the attention of the Council of the Institute and of all Allied Societies to their defects, in the hope that the subject would be taken up collectively, so as to bring united influence to bear upon authorities with a view to securing greater uniformity and reasonableness therein and in their administration.

"The plea put forth by some speakers that if surveyors were properly approached and 'stroked the right way' architects would generally get what they wanted, is to my mind extremely objectionable. Why should architects have to toady to district surveyors? If by-laws were reasonably framed and administered there should be no occasion for it.

"Although the resolution adopted is so far satisfactory, it would have been better had it been more general in its application, so that the Council of the Institute and of all Allied Societies would have felt bound to take united action. I am glad to learn that Mr. Lacy W. Ridge will bring forward resolutions, *re* Building By-laws of Rural Districts, at the next business meeting of the Institute; but I should have preferred to find that the whole subject of provincial by-laws and their administration was to be taken in hand.

"It was fortunate that Mr. P. Gordon Smith, architect to the Local Government Board, was at the meeting, and comforting to find he stated that 'regulations' of district councils could not be enforced. I willingly give credit to many district surveyors for the admirable work they do, but there are exceptions, and some, undoubtedly, err on the side of excessive zeal. The action of the Sunderland architects is worthy of imitation, and indicates that united action would be even more effective."

*** London members will have an opportunity of expressing their views on some of the points discussed by Mr. Henman at the Business Meeting of the 16th January, when Mr. Lacy W. Ridge [*F.*] has given notice that he will move a series of Resolutions on Local Building By-laws in rural districts. The Resolutions are printed in the *Supplement* to this issue.

THE DINNER.

A gathering of ninety-seven assembled at the Grand Hotel at 7.30, and were there received by Mr. H. L. Florence, Vice-President, who afterwards took the chair at the dinner. Among the guests of the Institute and the Association were the Lord Mayor and the Deputy Lord Mayor of Birmingham, Sir Benjamin Stone, M.P., Sir James Sawyer, Mr. J. Powell Williams, M.P., Mr. Wm. Kenrick, M.P., Mr. J. T. Middlemore, and other gentlemen officially connected with Birmingham institutions. From various expressions of opinion that have been received it seems that the gathering was in every way successful. Subjoined is a complete list of those present, and a report of the speeches.

Mr. De Lacy Aherne; Mr. F. E. F. Bailey [*A.*]; Mr. David Barclay, President of the Glasgow Institute; Mr. C. E. Bateman [*F.*], President of the Birmingham A.A.; Mr. R. I. Bennett [*F.*], President of the Manchester Society; Mr. E. C. Bewlay; Mr. W. H. Bidlake [*A.*]; Mr. E. J. Bigwood, Secretary of the Builders' Association; The Right Hon. the Lord Mayor of Birmingham; Mr. E. Boardman [*F.*]; Mr. John Bowen, President of the Birmingham Master Builders' Association; Mr. B. Bower; Mr. H. T. Buckland; Mr. J. T. Bunce, Chairman of Committee of Management of the Birmingham School of Art; Mr. E. Butler; Mr. G. H. V. Cale; Mr. J. H. Cartland, High Sheriff of Worcestershire; Mr. P. B. Chatwin; Mr. A. E. Cheatle; Mr. T. E. Collcutt [*F.*]; Mr. Thomas Cooper [*A.*]; Mr. George Corson, President of the Leeds and Yorkshire

Society; Mr. John Cotton [*F.*]; Mr. G. A. Cox; Mr. J. A. Crouch; Mr. W. Derry; Mr. W. Doubleday; Mr. A. Edwards; Mr. John Ely [*F.*]; Mr. W. Emerson, *Hon. Secretary R.I.B.A.*; Mr. Oliver Essex [*F.*]; Mr. W. M. Fawcett, *Vice-President R.I.B.A.*; Mr. H. L. Florence, *Vice-President R.I.B.A.*; Mr. Ernest George, *Vice-President R.I.B.A.*; Mr. E. M. Gibbs [*F.*]; Mr. J. Goodacre [*F.*]; Mr. J. Goodman; Mr. E. A. Gruning, *Vice-President R.I.B.A.*; Mr. H. B. Guest; Mr. A. Hale [*A.*]; Mr. Wm. Hale [*F.*]; Mr. Ewen Harper; Mr. J. A. Harper; Mr. A. Harrison; Mr. Stockdale Harrison [*F.*]; Mr. R. S. Heath, Principal of Mason College; Mr. William Henman [*F.*]; Mr. G. H. Hunt [*F.*]; Mr. Wm. Kenrick, M.P.; Mr. H. R. Lloyd [*A.*], Vice-President of the Birmingham A.A.; Mr. W. H. Lloyd; Mr. W. J. Locke, *Secretary R.I.B.A.*; Mr. A. R. Lynex; Rev. E. F. M. McCarthy, Chairman of the Birmingham School Board; Mr. H. H. McConnal [*A.*]; Mr. A. E. McKewan [*A.*], Hon. Secretary of the Birmingham A.A.; Mr. F. W. Martin; Mr. John T. Middlemore; Mr. T. R. Milburn [*A.*]; Mr. W. Milburn; Mr. Thomas Naden; Mr. T. W. F. Newton; Mr. G. S. Nicol; Mr. J. C. Nicol [*A.*]; Mr. Paul Ogden [*F.*]; Mr. J. B. Orwin; Mr. Owen P. Parsons and guest; Mr. S. Perkins Peck [*A.*]; Mr. A. R. Phipson [*F.*]; Mr. Jonathan Pratt, Secretary of the Society of Artists; Mr. W. J. Price, City Surveyor, Birmingham; Mr. E. F. Reynolds; Mr. W. A. Royle [*F.*]; Dr. Saundby, President of the Medical Institute; Mr. A. E. Sawday [*F.*], President of the Leicester Society of Architects; Sir James Sawyer; Mr. H. D. Searles-Wood [*F.*]; Mr. A. Short; Mr. C. Silk, Hon. Secretary of the Birmingham A.A.; Mr. John Slater [*F.*]; Sir James Smith, Deputy Lord Mayor of Birmingham; Mr. J. Smith; Mr. P. Gordon Smith [*F.*]; Mr. H. Heathcote Statham [*F.*]; Sir Benjamin Stone, M.P.; Mr. E. R. Taylor, Head Master of the School of Art; Mr. H. H. Thomson [*A.*]; The Rev. A. R. Vardy, Head Master of King Edward's School; Mr. John Ward; Mr. Aston Webb [*F.*], F.S.A.; Mr. J. Powell Williams, M.P.; Mr. Wm. Woodward [*A.*], and representatives of the Press.

The usual loyal toasts having been honoured,—

Sir JAMES SMITH proposed "The Houses of Parliament." Every one, he said, especially those who did not live in London, took a pride in the Houses of Parliament, and agreed that the buildings were such as the nation could be justly proud of. It was a curious coincidence that the best public building in Birmingham, viz., King Edward's Grammar School, in New Street, was also designed by Barry, the architect of the Parliament Houses. He was afraid Birmingham could not boast of many buildings of the same merit as this. Birmingham was rather a city of manufacturers, and there was not much scope for architectural beauty in building factories, especially when all wanted their factories as large as possible for the smallest amount of money. In taking a stranger round Birmingham to show him the public buildings a start should be made at the Grammar School. Then, if the visitor could be got to keep his eyes shut until the Town Hall was reached, a good impression would be produced, for the Town Hall, both inside and out, was a building of which Birmingham folk were not ashamed. Some of the modern buildings, such as Mason College, the Victoria Courts, and the new General Hospital, did the city credit. The City Corporation recently had offered to them by Mr. J. T. Middlemore, one of Birmingham's most generous citizens, some very valuable pictures on condition that the Corporation should build a new Art Gallery. If this offer were accepted by the City Council he hoped Birmingham would have a new Art Gallery worthy of the pictures it would contain, but he recognised that the erection of the proposed new gallery would not be without its difficulties. It must be connected to the present municipal buildings by a bridge across a street, and he feared that an angel—much less an architect—would be puzzled to give them all that they wanted. To design this bridge so that it would be in character with the new building and also in keeping with the old, would not be an easy matter. The bridge must be as light and beautiful as a dream, and yet be substantial enough to take six aldermen abreast. He was glad to see that the "severe order of architecture," as Mr. Morris called it, was dying out, and that buildings with cemented fronts were not now being erected. The fashion in architecture was always changing. To-day it seemed to be the reign of terra-cotta, and those who were having new buildings erected at the present time might feel as confident that terra-cotta materials would be used as that there would be extras on the architect's specification. In all new public buildings it was desirable that there should be some endeavour to elevate the taste of those people who spent so much of their time in factories by showing them specimens of architecture which would have an ennobling influence. In London, of course, they would always find the best buildings. Every agency, every insurance company, every bank, must be represented there by an imposing architectural structure. The theatres erected in London during the last few years alone were almost a school of study in themselves, and in his opinion the only public buildings in London which were absolutely out of date were the railway stations. With one exception the London railway stations were very ugly, and most of them devoid of any beauty at all. If only the members of the Royal Institute of British Architects had a free hand—and of course railway companies would not carp at a few extras—what a transformation they could make!

Mr. POWELL WILLIAMS, M.P., in response, said the Houses of Parliament were impressive, stately, and appropriate, notwithstanding the insignificant fact that the Second Chamber was not at all capable of holding the persons for whose accommodation it was intended. That, perhaps, did not matter very much, because he had not himself observed, except on very special occasions, any particular eagerness on the part of the peers to be present in their places. There was something about the Houses of Parliament themselves which showed on the part of the man who designed them a real genius for his profession, and it was some-

times a matter for wonderment that their style and form were not more frequently copied. The exterior looked all tranquillity, and that was a considerable advantage considering what sometimes took place inside. Internally, the structure answered its purpose very well.

The CHAIRMAN, giving the "Corporation of Birmingham," said that as he travelled towards Birmingham that afternoon he was utterly at a loss what to say about its Lord Mayor and its Corporation, because Birmingham municipal life was a subject of which he was profoundly ignorant. But on reaching the suburbs of the city he looked out through the window for an inspiration, and saw a tall chimney and some smoke. These gave him what he thought would be a good subject. Architects regarded smoke as their most determined enemy, for it destroyed material, and form, and colour, only leaving proportion as a distinguishable feature, and proportion was, unfortunately, the feature in which architects were mostly deficient. As architects they were well accustomed to smoke. All great schemes began in smoke; some continued in smoke; and not a few ended in smoke; but no one could have failed to recognise that in the last few years great progress had been made by all municipal institutions. Wherever they went they could not fail to notice the magnificent buildings put up by the great provincial towns—greatly to the benefit of the architect's profession, many members of which were thereby enabled to make fame and, it was to be hoped, also fortune. On reaching Birmingham he perceived that the city was not enveloped in the dusky cloud he had expected, and his one topic for discussion was therefore taken from him. But during the short time he had been in Birmingham he had been surprised to see the magnificent scale on which public improvements were carried out. Their new street, for instance (Corporation Street), was carried through in a straight line without any of the awkward curves and corners and unexpected divergencies they met with in all the later so-called improvements in London. It was a very great thing to find a municipality carrying out such great improvements, and yet these improvements were in one sense not without their disadvantages, because, when one great scheme had been carried out, a still greater one was next demanded. With the greatly increased powers given to Municipal Corporations more was now expected from them—not only new thoroughfares and similar improvements, but pellucid rivers and stately embankments, and public buildings of palatial and sumptuous architectural design. All these they looked for in the future; but there were many other important works—the dwellings of the poor and the working classes, for instance, demanded not merely actual buildings, but buildings containing some element of art which should spread its ennobling and elevating influence on the minds and feelings of the greatest possible number.

The LORD MAYOR OF BIRMINGHAM, in responding, said that, although Birmingham could not always be engaged on magnificent buildings which afforded scope for the great leaders of the architectural profession, they were continually extending in the suburbs, and even in the centre of the city the renovations which were taking place must afford great opportunities for the rank and file of the architectural profession. They had done something for the profession by their extensions, but they were doing more for the profession in another direction. For the prosperity of the artistic professions it was essential that there should be a public capable of appreciating art, and the Corporation of Birmingham for some years past had been giving special attention to the education of their young people, so that they might become able to realise the beauties of architectural design. When they had been educated sufficiently the young people would be able, in a walk through the streets of Birmingham, to see every variety of architectural design—more or less embellished or disfigured by that smoke to which the Chairman had referred. With this great variety of architectural design it was no wonder that already, without waiting for the development of the critical faculties of the young people, they had a great variety of criticism, and this criticism came quite as much from the members of the architectural profession as from any other source. He could not assume that any of the architectural criticism arose from professional jealousy, and therefore he concluded that there was a wide diversity of opinion among architects at the present time as to what really was good, bad, or indifferent in architectural work. This led him to ask whether the rising generation of architects was taking advantage of all the possible opportunities in art education. To that question he did not know the answer, but it was quite certain that if they were not, and if the public were being educated in art at a greater rate than the members of the artistic professions, there would be something very much amiss in the future. Passing on to speak of the relations of municipal authorities with the architectural profession, the Lord Mayor said that, taken individually, the members of the Birmingham Corporation, for instance, were excellent men of business, but when they were taken collectively they often sacrificed business instincts for what they considered to be of greater importance—matters of principle; that was so particularly in regard to architectural matters, and he often felt that it would be wiser as a rule on the part of the Corporation to discuss architectural matters in the same way they would if they were acting as private individuals, and not to blindly insist on a competition, whatever the subject might happen to

be. While recognising the advantages of competitions as a rule, he thought there were exceptions when they would break away from that rule and talk over with the architect any proposed new building, in the same way as they would if they were acting privately for themselves.

Mr. J. T. Bunce proposed "Architecture and the Kindred Arts." He asked his hearers to consider what a large and weighty subject his toast dealt with—Architecture, the oldest and most venerable of all the arts; the art which in its principles and in its visible form and in its developments from the age of the cave-dwellers to our own day, embodied and recorded the growth of civilisation and the history of human progress; the art which had not ineptly been described as "the printing press of all ages." Then the other part of the toast—the Kindred Arts; mainly the arts of sculpture and painting, with other forms of internal and external decoration. As to how important these were, and how closely they were related to architecture, there was the testimony of two eminent witnesses. M. Viollet-le-Duc said in his "Lectures on Art" that "sculpture and painting are to architecture what the drama and poetry are to music—its derivatives, its necessary complements." And Mr. Ruskin, speaking in his broader and stronger way, declared that "there are only two fine arts possible to the human race, sculpture and painting. What we call architecture is only the association of these in noble masses, or the placing them in fit places. All architecture other than this is, in fact, mere building." Speaking before so many masters of architecture, he would not venture to contest this dictum of Mr. Ruskin, nor attempt to trace the growth of architecture and its kindred arts in their infinite developments. The only course to be followed on that occasion was to relinquish a hopeless task and put aside such a tremendous theme. Not so very long ago Birmingham was an ugly town. Art was not unknown in the town, for Birmingham had produced some great painters and a fine succession of great engravers; the Society of Artists had kept steadily for many years a brilliant light; and there were in private hands several fine collections of pictures. But the community itself had done little for art in any form but that of music. Excepting the Town Hall there was no public building of distinction; the chief streets were narrow, ill-arranged, mean in their architecture—a poor, debased, sham classic being their main characteristic in this respect. Factories were hideous in their plainness, and but for a few examples of fine half-timber work—now unhappily mostly swept away by the so-called "march of improvement"—houses were devoid of taste in design, consisting, as a rule, of the familiar rectangular boxes punctured at intervals with holes to serve as doors and windows. Now, thanks to municipal spirit, to advancing education, and to the skill of later architects, they had broad and handsome streets, cut through once congested areas, and giving free play to light and air—streets which would bear comparison with the best in any town in the kingdom. Though Birmingham still possessed some public buildings of which Birmingham folk were not inordinately proud, there were others which showed a great measure of progress, such as the noble Parish Church of St. Martin, the Mason College, the School of Art, the Midland Institute, the new General Hospital, and the exquisitely graceful Victoria Courts, and they had also a singularly fine series of Board Schools. The newer factories and warehouses were, many of them, stately structures, the shops were often marked by artistic quality, and a large proportion of suburban dwellings erected within the last twenty-five years recalled the days when English domestic architecture was at its best and highest. He did not say that they had attained it, but in much of recent architecture architects and their clients had striven to work with the spirit of those great Italians, who, at a happy period, united the strictness and severity of Gothic with the richness and freedom of the early Renaissance. In not a few buildings, public and private, the aid of the kindred arts of sculpture and painting had been called in, the former freely, and, as to the latter, it was something to have enriched the Town Hall with mural pictures, and a great thing to possess the magnificent series of Burne-Jones windows in St. Philip's Church. Much more had been done than this. The education of the people, particularly in the artisan classes, in the principles and methods of true art, in the Museum and Art Gallery, and by the Municipal School of Art (which included an architectural school), had been attended with a large measure of success. These details of local progress merely touched the fringe of a great subject into which he could not more deeply go. He therefore gave the toast of "Architecture and the Kindred Arts." Architecture, impersonating her as the Mother of the Arts—recognising her majestic unity, and yet the grace of her infinite variety—placed between her handmaidens, Sculpture and Painting, inseparable from her as the complement of her structural designs and as the necessary enrichments of the royal robe she wears.

Mr. W. H. Bidlake [*A.*], responding, said that although the exclusive spirit of early times had passed away and a broader and more altruistic one had taken its place, architecture, if she were true to her traditions, would still express, as she had always expressed, the ideas and ideals of the times. In Birmingham the commercial and the municipal ideals were dominant, and he believed it was quite possible for architecture to express those ideals as well as to express the ideals of more classical periods. The municipality no doubt owed

much to architecture, and architecture in turn owed much to that broad and enlightened municipal spirit which required not only that a building should be useful, but that it should also be beautiful.

Mr. J. T. MIDDLEMORE, replying to the same toast, said that art in England had much to congratulate itself upon: the multiplication of schools of art, the appreciation of what was really good in art, whether applied to buildings or to pictorial art, and the dissatisfaction generally felt with the pompous, the pretentious, and the unbecoming. The dignity of the calling of the artist had been raised enormously within the last half-century, and artists themselves would acknowledge that the emoluments of their art had been much increased. It would be interesting to hear some explanation of what produced good and great art amongst a community nowadays. The great mediæval art was produced by a great Christian inspiration, accompanied doubtless by a revival of learning, and an earnest and thoughtful outlook on life. A deep faith, no doubt, produced a great art, and the deeper the faith the higher would the aim and effort of the artist be to do justice and to give reality to his work. Looking at our own times, it seemed to him that the same mental and moral forces which produced Watts and Holman Hunt, Burne-Jones and Millais, also produced Coleridge and Wordsworth, Tennyson and Browning, Newman, Liddon, and Westcott, Carlyle and Froude, Sir Wm. Hamilton and J. S. Mill, George Eliot, Dickens, and Thackeray. A spiritual course aroused the energies of these great people, and without its influence those energies would have lain latent or only half aroused; but on the whole the nineteenth century had deserved well of its children intellectually, morally, and artistically. What of the twentieth century? To him it seemed that one of the most notable spiritual forces would arise from the intense desire that to all, even the poorest, every possible means of culture should be open to every man, and have a chance for the growth and development of his own nature. This intense desire had produced our present galleries, and libraries, and schools, and it would, he trusted, grow into a great formative inspiration, under the influence of which men might be less worldly and selfish, and life be simpler and nobler, and even art itself more sincere, more great, and more elevating.

Sir BENJAMIN STONE, M.P., proposed "The Royal Institute of British Architects," detailing his familiarity with all the great architectural works of the world, and declaring his high conception and exalted feeling for architecture and for the ennobling part it had played in the history of the world. All could not now be architects, but to architecture even the layman owed a duty, that duty of respecting and preserving the ruins of ancient architecture from the vandalism one met with every day—vandalism which was a disgrace to modern society. Only on the previous day he went into a church by chance, and found that a magnificent rood screen had been cut in two because the churchwarden wanted to put in some furniture. What surprised him more was that the same churchwarden had taken some miserere seats and chiselled off the grotesque figures underneath because he thought they verged on impropriety.

The CHAIRMAN, responding on behalf of the Institute, said that it would be a great pleasure for him to report to the President that their meeting in Birmingham had been so successful. The Royal Institute of British Architects existed for several purposes—for the advancement of the art of architecture, and for the protection of the architects themselves. By the great extensions it had recently made in connection with Allied Societies—now numbering no fewer than seventeen societies in different parts of England, and even extending to Australia—they had naturally increased their influence, and at the same time they had created a bond of brotherhood which they were anxious to sustain and keep. Speaking of the proposed University for Birmingham, Mr. Florence said that as the proposal had excited such a great deal of attention and interest, he thought it advisable to see what subjects had been specially taken up at the University. He was surprised to find that, in spite of the great influence of Sir Benjamin Stone, and all they had heard from the leading lights of the City, and from members of the City Council that night, architecture was not included in the scheme, and he was afraid that public interest in architecture was not quite so sincere or so enthusiastic as the proposer of the toast would wish it to be. As further illustration of this he would refer to another city, at least as well known as Birmingham, where, in public advertisements for an architect to be engaged in the superintendence of the construction of some great works, the architect was to rank the same as a tramway director. He would be put on the same level, and receive exactly the same salary. That, he was happy to say, was not in Birmingham.

Mr. W. M. FAWCETT, *Vice-President*, gave "The Birmingham Architectural Association and the Allied Societies," and commended the Institute for having thrown open its arms and endeavoured as far as possible to join the country members with it in forming a mutual body for the representation of the profession, and for promoting the general good and maintaining the high standard of the profession.

Mr. C. E. BATEMAN [*F.*], President of the Birmingham Architectural Association, and Mr. R. I. BENNETT [*F.*] (President of the Manchester Society of Architects) replied, the latter remarking that he was looking forward to the time when, by the aid of the examinations, their profession would be made as close as that of the law.

Mr. ASTON WEBB [*F.*] proposed "The Guests," and the Rev. A. R. VARDY having briefly replied, the company separated.